EXERCISING IN A STRUCTURED VERSUS AN UNSTRUCTURED SETTING: AN APPLICATION OF THE THEORY OF PLANNED BEHAVIOUR

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ABSTRACT

The main purpose of this study was to examine the constructs of the theory of planned behaviour (TPB) in two different exercise settings – structured versus unstructured. Owing to the assumption that individuals may perceive less volitional control in a structured setting versus an unstructured setting, it was hypothesized that perceived behavioural control would be a stronger predictor of exercise behaviour in the structured setting. A secondary purpose of the current study was to assess the utility of using two different exercise outcomes – energy expenditure and exercise frequency – to assess exercise behaviour. Participants (N = 207) were recruited from a first-year kinesiology university class. Data collection occurred over two time periods, nine days apart, and was conducted during class periods. During the first testing session, participants were provided with a questionnaire that assessed TPB constructs and physical activity level in the two settings (structured versus unstructured) using the Modifiable Activity Questionnaire (MAQ). Half of the participants were requested to complete the TPB constructs using energy expenditure as the outcome measure and half were requested to complete the constructs using exercise frequency as the outcome measure. In the second testing session, all participations were asked to report their exercise levels over the previous seven days using the MAQ. In terms of predicting intention, hierarchical regression analyses revealed that, contrary to the hypothesis, perceived behavioural control was more predictive in the unstructured setting versus the structured setting. Although not predicted, it also was found that subjective norms were a significant predictor of activity intention in the structured but not the unstructured setting. The results using the two different outcome measures (e.g., energy expenditure versus

frequency) also revealed differences; however, no consistent pattern emerged. One relationship that did emerge was the finding that perceived behavioural control was found to be a stronger predictor of intention in the unstructured setting using energy expenditure as an outcome versus exercise frequency. Finally, the results revealed little support for the TPB constructs predicting self-reported physical activity behaviour. Practical implications and future directions are discussed.

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1.1 Introduction

A recurring message by health professionals across North America is that a life-long commitment to physical activity is an essential component to a healthy lifestyle (Health Canada, 2000). The psychological and physiological benefits of regular activity to the health and well being of both active and sedentary populations across the lifespan are well documented (cf. Fletcher et al. 1996). The benefits that accrue to those who are active include primary and secondary prevention of cardiovascular disease (Miller, Balady, & Fletcher, 1997), control of obesity and diabetes (Boule, Haddad, Kenny, Wells, & Sigal, 2001), lower incidence of depression and depressive symptoms (Salmon, 2001), better control of and reaction to stress (Salmon, 2001), and an overall tendency to being "better adjusted" (Fletcher et al., 1996).

Despite the benefits of regular physical activity, statistics reveal that 56% of Canadians are not active enough to receive optimal health benefits (Craig & Cameron, 2004). Further, 41% of Canadians aged 15-19 are active enough to obtain health benefits versus only 30% of Canadians aged 20-24 (Craig & Cameron, 2004), suggesting that individuals aged 18-24 are an important age group to study.

Given the current state of inactivity among young Canadians, interventions aimed at improving health through exercise appear warranted. It is important, however, to remember that these interventions need to be grounded in empirical research that has

a solid theoretical focus. As Brawley (1993) proposes, "individuals interested in understanding and intervening in health and exercise-related contexts must adopt the scientist-practitioner model… [where] theory guides practice" (p. 99). An intervention that is based upon a suitable theoretical framework, as opposed to an intervention based on the findings of a few studies for example, is important for a number of reasons. First, theoretical frameworks are inherently organized and ordered and thus provide structure and guidance to an intervention (Brawley, 1993). More importantly, perhaps, a framework is grounded in a pool of scientific research so if an intervention is found to be less successful than anticipated, a well-crafted theory should be able to provide some direction in explaining why it was not successful (Brawley, 1993). Conversely, if an intervention is built on the results of an isolated study or based solely on personal experience, there is no ordered method of explaining aberrations in results. Therefore, it is essential when examining the issue of inactivity that it be couched within a sound and appropriate theoretical framework.

In terms of explaining behaviour change in the exercise setting, one theoretical framework that has featured prominently is social cognitive theory (Bandura, 1986). The main tenets of the social-cognitive perspective are that behaviour is based in cognitive activity, is purposeful, and is under the control of the individual (Bandura, 1986). It also assumes that environmental factors, personal factors, and behaviour are mutually interacting influences (Bandura, 1986). Within the social cognitive perspective, two related theories that have been featured prominently in the exercise setting are the theory of reasoned action (Fishbein & Ajzen, 1975) and the theory of planned behaviour (Ajzen, 1985).

The theory of reasoned action (TRA) was developed to explain volitional behaviour and is based on the premise that individuals behave in a rational manner by taking into account information that is available to them and by considering the possible implications of their behaviour (Ajzen & Fishbein, 1980). The TRA proposes that an individual's intention to perform a given behaviour is the immediate determinant of that behaviour (Ajzen, 1988). Further, intentions are the product of two cognitive processes: *attitude toward the behaviour* (the individual's positive or negative perception of performing the given behaviour) and *subjective norms* (the individual's perception of pressure from important others to perform or not perform the given behaviour). The TRA has been found to be most useful in situations of complete volitional control (e.g. voting); that is, situations in which the individual has complete free choice over their behaviour (Blue, 1995). However, for many behaviours, such as exercise, there can be barriers impeding the execution of that behaviour that may limit the individual's control over the behaviour. To address this shortcoming, Ajzen (1985) added another element to the original TRA model – perceived behavioural control (PBC). With the addition of PBC, the revised model was called the theory of planned behaviour (TPB), which is the focus of this study.

1.2 Literature review

1.2.1 Theory of Planned Behaviour

As in the TRA, intention is a key element in the TPB. Intentions are proposed to hold the important motivational factors that help determine behaviour. Intention has been defined as "the cognitive representation of a person's readiness to perform a

behaviour" (Ajzen, 2002c). Further, intention is thought to be the aggregate of three predictor variables (attitude towards the behaviour, subjective norm, and perceived behavioural control), which are weighted in terms of their importance and relevance to the behaviour in question and the individual(s) performing that behaviour. The three predictor variables are the product of a set of salient beliefs associated with that variable (see Figure 1).

Attitude toward the behaviour is the individual's degree of positive or negative value toward a given behaviour. This value stems from the individual's beliefs about the projected outcome of the behaviour and the evaluation of this outcome. In turn, the individual forms positive attitudes towards those behaviours that produce desirable outcomes and negative attitudes towards behaviours that are linked to undesirable outcomes. Given that many behaviours have several potential outcomes, both positive and negative, the resultant attitude (A) is established by summing together the strength of each belief (b), multiplied by the subjective evaluation (e), of the expected outcome. The relationship is expressed mathematically below:

$$A \alpha \Sigma b_i e_i$$

Attitudes tend to be formed from both beliefs about the consequences of engaging in the behaviour as well as the positive or negative evaluation of the consequences of engaging in the behaviour. Accordingly, an individual who believes running on a treadmill will produce positive health benefits and perceives that to be a good thing is likely to form a favourable attitude toward running on the treadmill as a health-promoting behaviour.

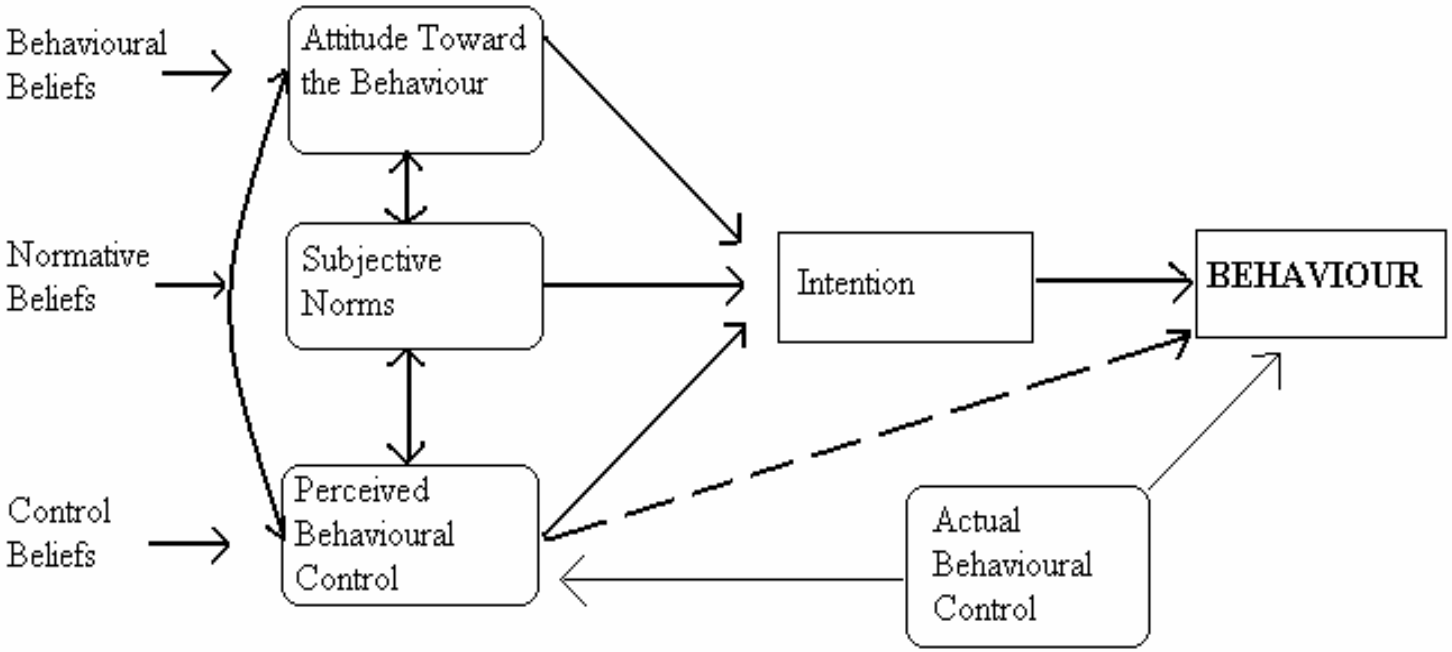

Figure 1. Schematic representation of the Theory of Planned Behaviour (Ajzen, 2002c)

Subjective norms are the individual's perceptions of the social pressure from important others to engage or abstain from a given behaviour (Ajzen, 2002c). Like attitudes, subjective norms are resultant of a set of normative beliefs. Normative beliefs are the perceived behavioural expectations of important others, which can include family, friends, spouse, doctor, teacher, and so on. The subjective norm component is determined by the summation of the strength of each normative belief (n) (for the referent group in question), multiplied by the individual's motivation to comply (m) with that referent:

$$SN \alpha \Sigma n_i m_i$$

Like attitudes, subjective norms are determined by two factors. In the first instance, norms are formed through an individual's perceptions about the expectations of important others. In the second instance, norms are formed as a result of the individual's motivation to comply with the expectation of important others. For example, it might be expected that the social norm to be active would be strong if a person perceived that important others valued the individual being active and that person cared about the perception of those important others.

While attitude, subjective norm and intention are constructs appearing in both the TRA and the TPB, what makes the TPB conceptually different from the TRA is the addition of the *perceived behavioural control* construct. PBC, which is a construct similar to self-efficacy, refers to an individual's perception of the degree of personal control over a given behaviour (Ajzen, 2002c). The individual's perception is formed by a set of control beliefs concerned with the presence or absence of resources and opportunities relevant to the behaviour. PBC is determined by summing the products of

the strength of each control belief (c), multiplied by the perceived power (p) of that control factor to inhibit or facilitate performance of the behaviour:

$$PBC \propto \Sigma c_i p_i$$

PBC, like attitudes and subjective norms, is used to predict intention; however, it serves a second unique function as well. If PBC accurately reflects the individual's level of *actual control*, then PBC can serve as a proxy for actual control (represented by the dotted line in Figure 1) and, in turn, become a direct predictor of behaviour, independent of intention (Ajzen, 2002c). The predictive ability of PBC on behaviour is based on an inverse relationship. The theory states that as available volitional control decreases, the importance of PBC increases as it becomes a more discriminating predictor.

The final component of the TPB is, of course, the behaviour itself. Ajzen (2002c) defines behaviour as the tangible expression of relevant intentions and perceptions of behavioural control. Given a sufficient degree of actual control over the behaviour in question, an individual would be expected to follow through on their intentions and engage in the behaviour when the opportunity arises. Although it is conceptually plausible that intention is moderated by PBC, this interaction has not been found to be significant in practice (Ajzen, 2002b).

The TPB further postulates that just as attitudes, subjective norms, and PBC are antecedents to intention, they also have their own antecedents. Ajzen (1991) posits that a basic tenet of the TPB is that salient beliefs (i.e., those beliefs that we attend to and consider important) are ultimately responsible for intentions and actions, through their influence on attitudes, subjective norms, and PBC. Three distinct kinds of beliefs are

offered: *behavioural* beliefs, *normative* beliefs, and *control* beliefs, which influence attitudes, subjective norms, and PBC, respectively.

Theoretically, then, a combination of beliefs leading to a favourable attitude toward the behaviour, a perception of approval and support from relevant or important others, and a sufficient and accurate perception of control, should lead to a greater intention to perform a given behaviour. In turn, a greater intention, supported by a sufficient and accurate degree of PBC, should result in the actual performance of the behaviour in question.

In terms of use of the theory, the TPB has been successfully applied in several different settings as reported in a recent meta-analysis (Armitage and Conner, 2001). Armitage and Conner (2001) examined the theory across several settings ranging from smoking behaviour (Babrow, Black, & Tiffany, 1990) to condom use (Nucifora, Gallois, & Kashima, 1993) to choice of transportation (Bamberg & Schmidt, 1993), and found correlations that they classified to represent "medium" to "large" effect sizes, as suggested by Cohen (1992). This suggests that the TPB is a meaningful predictor of behaviour across a variety of settings. Godin and Kok (1996) took a more focused approach than Armitage and Conner and looked at health-related settings. Godin and Kok (1996) found the theory to perform very well in predicting both intentions ($R^2 = 0.41$) and behaviour ($R^2 = 0.34$) across health-related behaviours in general, with exercise being one such behaviour.

1.2.2 Theory of Planned Behaviour and Exercise

The TPB has been used extensively as a theoretical framework for explaining

behaviour in the exercise domain for numerous populations including youth (Motl et al, 2002), competitive athletes (Mummery & Wankel, 1999), patients with heart disease (Godin, Valois, Jobin, & Ross, 1991), pregnant women (Godin, Valois, & Lepage, 1993) and apparently healthy adults (Bryan & Rocheleau, 2002). There have been various reviews conducted over the years examining the TPB in physical activity settings. In one of the earliest narrative reviews, Godin (1993) summarized the published studies applying the TRA and TPB to the prediction of exercising intention and behaviour. Among the eight published studies that included the TPB reviewed by Godin (1993), all of the studies showed additional variance explained in behavioural intention by the construct of PBC over and above that accounted for by the TRA. He found partial support for the usefulness of the TPB in predicting actual exercise behaviour with two studies (of the six that assessed behaviour) reporting significant contributions by PBC to predicting behaviour above that explained by intention. In a meta-analytic review of 31 studies, Hausenblas, Carron, and Mack (1997) found that the TPB predicted physical activity intentions and behaviour very well. As illustrated in Figure 2, Hausenblas et al. (1997) found large effect sizes for relationships between intention and attitude (ES =1.22), intention and PBC (ES = 0.97), behaviour and intention (ES = 1.09), behaviour and attitude (ES = 0.87), and behaviour and PBC (ES = 1.01). The relationship between intention and subjective norms revealed a medium effect size (ES = 0.56) while the relationship between behaviour and subjective norm was zero-order. An effect size is a standardized value that is calculated by dividing the difference in means by the standard deviation (Thomas & Nelson, 2001). Effect sizes in this case were categorized based on the recommendation of Cohen (1992) where values

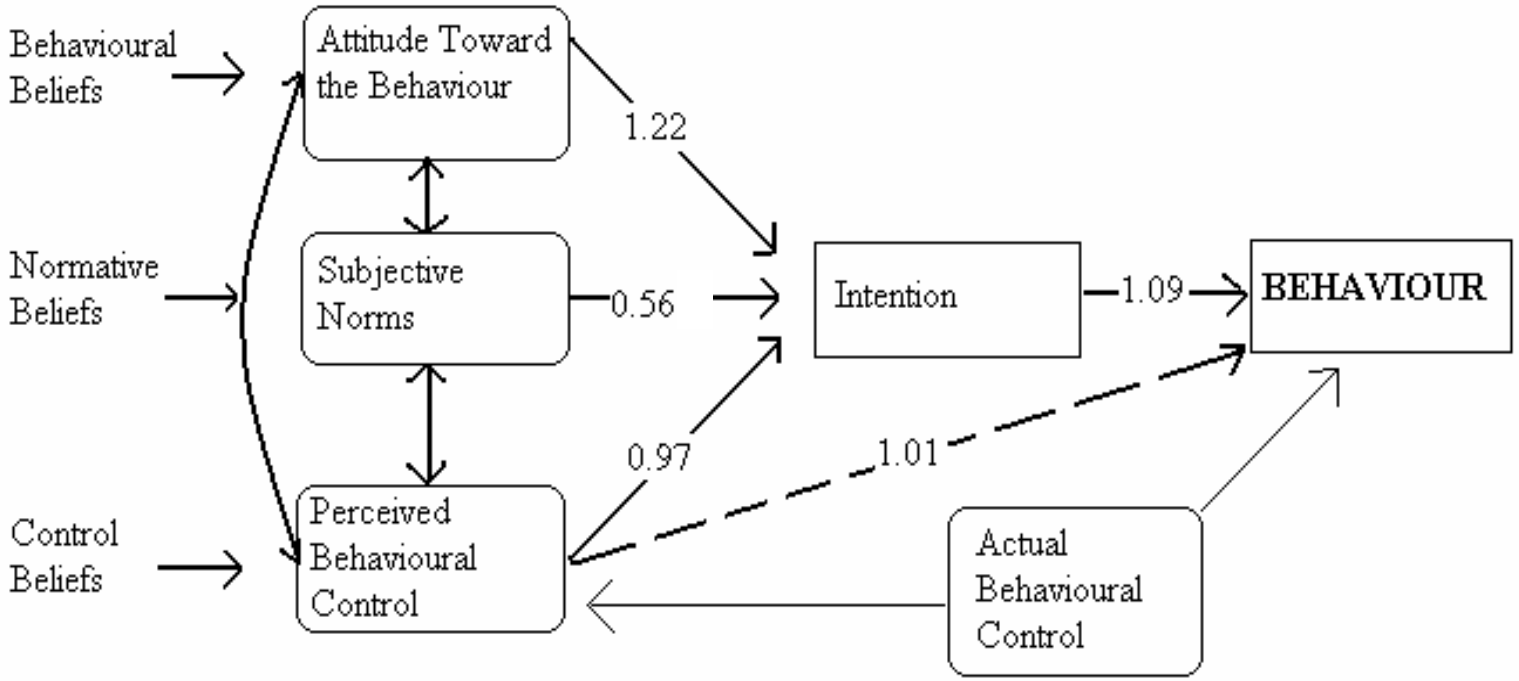

Figure 2. Effect sizes for the Theory of Planned Behaviour (Hausenblas, Carron, & Mack, 1997).

of .20, .50, and .80 were grouped as small, medium, and large, respectively.

Hagger, Chatzisarantis, and Biddle (2002) extended these findings in their own meta-analysis by including the amount of variance in intention and behaviour explained by the TPB in an exercise setting. Hagger et al. found that the TPB model was able to explain 44.5% of the variance in intention and 27.41% of the variance in exercise behaviour. Hagger et al. also reported effect sizes for the other relationships in the theory that were similar to the ones reported by Hausenblas et al. (1997) in their meta-analysis.

As indicated above, the relationships predicted by the TPB have generally been supported in the exercise setting in the general population. The same can be said for the young-adult population in particular. A number of studies have found the TPB to be predictive of both intentions to exercise and exercise behaviour itself in young adults. Using the TPB, Bryan and Rocheleau (2002) were able to account for 67% of the variance in intention to engage in resistance training and 40% of the variance in actual resistance training behaviour in male and female college students. In another study, Okun, Karoly, and Lutz (2002) found smaller but still significant results in studying leisure-time exercise behaviour in 530 college students. Okun et al. found that the TPB was able to account for 35% of the variance in intention and 20% of the variance in leisure-time exercise behaviour. Coupling studies such as these with the support provided by various reviews and meta-analyses (Blue, 1995; Hagger, Chatzisarantis, & Biddle, 2002; Hausenblas, Carron, & Mack, 1997) suggests that the TPB is a valid and reliable theoretical framework for examining exercise behaviour generally, and in young adults, specifically.

It is worth noting that studies examining the TPB in exercise settings have not always resulted in findings that support the predictions of the theory. For example, Yordy and Lent (1993) prospectively examined undergraduates to compare the utility of various social cognitive models, including the TRA and TPB. The authors found that the TPB did not make any significant improvement over the TRA, possibly suggesting that PBC was not an important predictor in the exercise domain. Dzewaltowski, Noble, and Shaw (1990) reported similar results. They found that while PBC made a significant contribution in predicting intention to participate in physical activity, PBC had no direct effect on actual participation.

In looking at both exercise intention and behaviour, Bozionelos and Bennett (1999) found that PBC was only predictive of intention. Further, neither attitude nor subjective norms were predictive of intention. While subjective norms have consistently been regarded as the weakest of the TPB constructs (e.g. Blue, 1995; Hagger et al., 2002), the finding of attitudes not being a significant predictor was unexpected (Hausenblas et al., 1997). Kerner, Grossman, and Kurrant (2001) also found an unexpected result when they studied intentions to exercise and exercise behaviour of apparently healthy adults. They split the adults into one of four groups: high intention-high behaviour, low intention-low behaviour, high intention-low behaviour, and low intention-high behaviour. In three of the four groups, Kerner et al. (2001) found that, not only were correlations between intention and behaviour of moderate magnitude, the relationships were actually *negatively* correlated. On the basis of these disparate findings, it is apparent that more research is warranted on the TPB and its application to the prediction of exercise intention and behaviour.

In addressing these inconsistencies, perhaps one avenue worthy of exploration is looking at the effect of moderators. Moderation refers to a situation wherein the strength and/or valence of a relationship between an independent and dependent variable is regulated by a second independent variable (i.e., the moderator) (Baron & Kenny, 1986). Further, in a recent review examining how researchers can best understand the influences on physical activity, the point was made that it is important to include moderators in any theoretical interventions involving physical activity (Baumann, Sallis, Dzewaltowski & Owen, 2002). Given that moderators produce different estimates of the relationship between theoretical predictors and outcomes, they are often implicated when variables (e.g., IVs and DVs) result in inconsistent relationships among one another (Baron & Kenny, 1986). As this is similar to the situation in the examination of the TPB in the exercise setting as reported above, it is possible that the inclusion of moderators may help to explain some of the inconsistencies previously reported.

A moderator acts as a third variable in the Independent Variable (IV) – Dependent Variable (DV) relationship and it can affect both the direction and magnitude of that relationship (Baron & Kenny, 1986). For example, the first IV may have a significant influence on the DV at one level of the second IV but this influence weakens at another level of the second IV. Or, in terms of direction, the first IV may have a significant positive relationship with the DV at one level of the second IV but have a negative relationship at another level of the second IV. The IV-DV relationship is said to be moderated when a third or extraneous variable segregates the IV into subgroups revealing different levels of effectiveness in its prediction of the DV (Baron & Kenny, 1986). An example of a moderator might be competency wherein the effects of a

specific intervention program might be much greater for those who are more competent versus those who are less competent.

Baron and Kenny (1986) have identified moderator variables as very important in theory development and practical application as moderators can uncover or clarify relationships among constructs and subsequently direct interventions. Baranowski, Anderson, and Carmack (1998), in a review of physical activity intervention studies, also recommend the use of moderators to increase the efficacy of predictive models as well as interventions. In their meta-analyses, both Hausenblas et al. (1997) and Hagger et al. (2002) recommended the examination of moderators in an effort to further the use of TPB. Years earlier, Ajzen (1985) hinted at this sentiment when he added the perceived behavioural control construct to the theory of reasoned action suggesting that level of control may moderate the relationship between intention and behaviour. Further, Blanchard, Courneya, Rodgers and Murnaghan (2002) used the TPB to look at the exercise intention and behaviour of individuals with cancer and found the salience of the theory's constructs to be different between individuals with breast cancer and those with colorectal cancer. If a moderator is able to produce stronger relationships among theoretical constructs by segregating a population into more specific sub-groups, interventions could be made more specific and perhaps be more successful. This again suggests that moderators may be important variables to study when examining the theory in the exercise setting.

As noted above, different populations (e.g., those with breast or colorectal cancer) have been implicated as potential moderators (e.g., Courneya and Friedenreich, 1997; 1999) in explaining the relationship between TPB constructs and exercise

behaviour. This begs the question of whether other types of moderators also may be important when using the TPB in the exercise setting. One possible moderator may involve *type* of exercise setting. The examination of setting as a potential moderator when testing the constructs of the TPB may be important owing to the fact that the tenets of the theory are subject to change as the behaviour or setting changes (Ajzen, 1991). For example, the relative importance of any of the constructs of the TPB may change as the situation changes (i.e., attitudes may be more important than subjective norms in Situation A, while the reverse may be true in Situation B). Further, the salient information an individual attends to, known as their "salient beliefs' (which are fundamental concepts of the theory), also may be situation specific, which could influence the relationship between intention and behaviour.

Further, in another study examining the use of discretionary time in adolescents in structured and unstructured settings (activities in general, not necessarily physical activities), the point was made of the "…increased explanatory power gained from examining multiple activity settings that include both constructive and passive activities" (Bartko & Eccles, 2003). While it is acknowledged that this study was concerned with adolescent behaviour in general, and not specific to exercise, the relevant suggestion of examining moderators to increase explanatory power is highlighted.

Recent literature has shown that factors such as different exercise types may, in fact, influence the magnitude of the relationship between TPB constructs and exercise behaviour. For example, Bryan and Rocheleau (2002) looked at the type of exercise (i.e., aerobic versus resistance exercise setting) in young adults. They found that, while

the TPB was able to account for significant amounts of variance in both types of exercise, more than double the variance (40% vs. 19%) in exercise behaviour was explained in resistance, as compared to aerobic, exercise. Also, it was found that PBC was a strong predictor of both intentions and behaviour for resistance trainers, where correlations between PBC and intentions/behaviour were 0.65/0.38, respectively, as compared to 0.51/0.17 in the aerobic exercisers. Invoking an explanation that highlights moderation, the authors suggested that PBC becomes a better predictor of behaviour in settings where there is less volitional control. They suggested that perhaps less volitional control was available in resistance exercisers because of the need for special equipment and facilities, whereas with aerobic exercisers, physical activity could be performed virtually anywhere with minimal equipment. Continuing with Bryan and Rocheleau's suggestion, it is plausible that level of control may provide a useful explanation when one moves from type of exercise activity to type of setting (e.g., involving more or less amounts of volitional control). One such distinction may lie in the difference between structured versus unstructured exercise behaviour.

1.2.3 Structured and Unstructured Exercise Settings

The structured-unstructured distinction to understanding physical activity behaviour is not a new idea, and has been used elsewhere (e.g., Poag-DuCharme & Brawley, 1993). However, the labelling and conceptualization of the terms structured and unstructured has not been completely consistent in the literature. The labels "lifestyle and structured activity" (Anderson et al., 1999; Dunn et al., 1999), "organized and unorganized activity" (Deforche & Bourdeaudhuij, 2000) and "formal and non-

formal activity" (Mota & Esculcas, 2002) have all been used in place of the structured/unstructured dichotomy. Conceptually, some have incorporated the notion of a leader (e.g., Mota & Esculcas, 2002) or supervisor (e.g., Deforche & Bourdeaudhij, 2000) to distinguish the two settings, some have used a group versus individual approach (e.g., Piepkorn, 1990) as an indicator, and some have dichotomized the setting partly based on whether skill development was a goal or outcome (Kleiber, Larson, & Csikszentmihalyi, 1986).

While the labelling of the structured-unstructured settings may be different, there is one underlying characteristic that appears similar across most studies – level of control. Generally speaking, the settings labelled structured, organized, or formal are, as their titles suggest, more rigid in structure and organization and thus leave less volitional control for the participant. In contrast, unstructured, unorganized, and non-formal activities provide the individual much more freedom and volitional control in their participation. Support for distinguishing the terms this way also comes from the dictionary definitions of structured and unstructured. Structured is defined as "giving form or arrangement to" while the term unstructured is defined as "lacking a definite structure or organization; not formally organized or systematized" (The New Penguin English Dictionary, 2000). The notion of level of control, however, is the basis for the conceptualization of structured and unstructured exercise settings in this study.

Several important characteristics used to operationalize the structured-unstructured dichotomy in previous literature will be utilized in this study to differentiate between structured and unstructured settings. Characteristics for a structured exercise setting include: the idea of organization (i.e., predetermined

activities and schedules)(e.g., Anderson et al., 1999); an "outside" individual(s) responsible for this organization (e.g., Piepkorn, 1990); and the involvement of other exercisers, usually in an exercise class setting (e.g., Deforche & DeBourdeaudhuij, 2000). An unstructured setting, on the other hand, has contrasting attributes. Exercise in an unstructured setting is performed with a self-determined schedule (e.g., Poag-DuCharme & Brawley, 1993) and often without others (e.g., Piepkorn, 1990) though this is not always the case.

It is also worth noting that the term exercise, as used in this study, is being distinguished from the term physical activity. Exercise, as opposed to physical activity, is purposeful in that it is done for the purpose of obtaining certain goals such as improving or maintaining cardiovascular strength or endurance, muscle strength or tone, and/or general health (Shephard, 1991). Consequently, the term exercise, as applied in this study, does not include walking to get groceries or helping move a friend in, unless those activities were done for health reasons.

Given that exercise occurs in many settings for young adults, including both structured and unstructured, investigation of both settings would appear important. Examining setting also is consistent with the recent suggestion of Baranowski, Anderson and Carmack (1998), who noted that one of the ways to increase the predictive value of determinants to explaining physical activity behaviour may be to develop separate models for different modes of physical activity (e.g., different settings).

This suggestion of differentiating between types of physical activity and exercise has been acted upon in recent studies. For example, Spink (2003) suggested that the use of a moderator (e.g., structured/unstructured) might be important in identifying the

correlates of physical activity. Specifically, he found that the social influence correlates of physical activity levels appeared to be moderated by type of setting (i.e., structured/unstructured). In an unstructured physical activity setting, peer compliance and peer conformity were the significant correlates that differentiated active from sedentary participants. However, in a structured physical activity setting, the social influence factors that differentiated active from sedentary individuals were peer compliance and significant other compliance.

In summary, the distinction between structured and unstructured exercise has been identified in the literature as a significant one. However, the use of exercise setting as a moderator (e.g., type of setting) has not been examined within the TBP framework. Based on the tenets of the TPB, and the empirical finding of Bryan and Rocheleau (2002), it might be speculated that in a structured environment the level of relative volitional control may be decreased given that the time, place, and nature of activity are often predetermined. If differences in control do, in fact, exist based on the setting, the importance of PBC is magnified. Specifically, given that PBC assesses the degree of personal control individuals perceive they have over the behaviour in question, it would become more salient when the ability to control the behaviour is limited. Using the characteristics noted above, it could be argued that there is an assumption that a structured exercise setting provides the participant with less volitional control than an unstructured setting. Given this assumption, specific constructs of the TPB (i.e., perceived behavioural control) might be more predictive in a structured setting as compared to an unstructured setting where choice, time, nature, intensity, and place of activity are presumed to be more self-determined.

1.3 Statement of Problem

The main purpose of the current study was to examine whether the predicted relationships between the constructs of the TPB would be moderated by the type of setting (structured versus unstructured) in a young, adult population. Based on the results of the Bryan and Rocheleau (2002), it is predicted that the PBC construct will be more predictive of intention and behaviour in a structured exercise setting where it is assumed that volitional control will be less than in an unstructured setting.

In terms of the other TPB constructs, there is no existing evidence to suggest that the relationship between the other constructs might be moderated by setting. However, from an intuitive perspective, it is predicted that attitudes will be more predictive of intention in an unstructured setting. Given that an unstructured setting, as defined in this study, may require more effort and organization to partake in (e.g., time, frequency, intensity, and nature of exercise have to be self-determined), a more positive attitude towards exercise may be required in that setting to create an intention to exercise. Therefore, attitudes are hypothesized to be more predictive of intention in an unstructured setting. Second, no relationship between subjective norms and intention is expected given that there is no way of knowing whether "important others" would be more in favour of a health-promoting behaviour such as exercise in one setting versus another. Concerning behaviour, no hypotheses are generated regarding the predictive ability of attitudes and subjective norms on behaviour. This is because the effects of attitudes and subjective norms on behaviour are theorized to be mediated through intention.

A secondary purpose of this study was to assess the utility of using two different exercise outcomes – energy expenditure and exercise frequency – to assess behaviour. Research using the TPB to predict exercise intention and behaviour has typically used a frequency outcome to assess exercise behaviour. However, the most recent suggestions by Health Canada (2000) indicate that energy expenditure is a more important indicator of potential health benefits than exercise frequency. Given this suggestion, this study sought to examine the constructs of TPB using a measure of energy expenditure as well as the more typical exercise frequency measure. As there is neither any TPB research utilizing energy expenditure as an exercise outcome nor research assessing the efficacy or reliability of energy expenditure as an outcome measure, no hypothesis was generated for this outcome measure.

Chapter 2

Method

2.1 Participants

For this study, 65 male and 142 female (N = 225) university students (mean age = 20.02 years, SD = 3.2) were recruited from two sections of a 1st year kinesiology university class to serve as participants. In addition to being an important age group to study as suggested in the introduction, the sample was chosen for reasons of convenience. The participant number was deemed sufficient to ensure that a proper ratio of 'participants to independent variables' (≈ 20:1) was captured (Vincent, 1999), allowing for attrition.

2.2 Procedure

The data were collected from the students during two separate class lectures. As students arrived to class, they were instructed to take one of two colour-coded questionnaire packages (the difference between questionnaire packages will be explained below), which included informed consent forms. The determination of which questionnaire package each student received was based on which laboratory section they were enrolled. This process allowed for a relatively equal and efficient distribution of the different questionnaire packages. Large signs were posted at both entrances to the classroom indicating which door students from a given laboratory section should go

through (e.g., students from Monday and Wednesday lab sections were directed go through one entrance and students from Tuesday, Thursday, and Friday labs through the other entrance). Additionally, each entrance was monitored by the researcher and a research assistant to instruct the student on which questionnaire package to take.

At the beginning of class, the participants were provided with a general introduction to the study (see Appendix A) and an overview of the consent form (Appendix A). They were then invited to participate in this study. The participants were told that the questionnaire would take approximately 15-20 minutes to complete and would include questions concerning their thoughts, perceptions, and participation in exercise (see Appendices B and C). After reading through the consent forms, all interested participants were instructed to sign the informed consent forms and await instruction on filling out the questionnaire. It was made clear to potential participants that participation was completely voluntary and non-participation would not adversely affect their standing in class, academically or otherwise. Those individuals not interested in participating were not provided with any specific instructions or activities to do and remained in the room for the duration of the data collection.

Given that data collection involved matching participant data from two time periods, it was necessary to have participants identify themselves on the questionnaire. However, to ensure confidentiality, individual names were replaced with an identification number before information was entered into a database. A master list of participant names and their identification numbers was stored separately from the questionnaires and the database. This process was explained in the consent form and also was reiterated verbally to the participants before they began the questionnaire.

Although the questionnaires came with detailed instructions, an overhead presentation was given to the participants for each of the two questionnaire packages before they started the questionnaire. These presentations reinforced the detailed instructions on the questionnaire as well as included a demonstration on how to properly fill out the questionnaire. Following the presentations, students were provided the opportunity to ask questions about the study or questionnaire before filling out the questionnaire. Participants were given approximately 20 minutes to complete the questionnaire, and were encouraged to ask questions of clarification. Participants were reminded of the importance of answering the questions independently and were again reassured that all of their responses would remain confidential.

Data collection occurred twice during the fall semester, nine days apart. Originally the study was designed to take place seven days apart, on two consecutive Mondays, but due to extenuating circumstances this was extended to nine days between data collection sessions. As it happened, during the access time that the instructor suggested for data collection, the second round of data collection fell on a Monday that was the day before a national holiday. Given this situation, it was anticipated that attendance for a class immediately before a national holiday and immediately following a weekend might be below what is normally expected as many students, especially those from out of town, might miss class in favour of a long weekend. Cognizant of this possibility, the decision was made to collect data during the class following the national holiday (the subsequent Wednesday). Thus, the second round of data collection was scheduled nine days after the first session rather than the planned seven days.

The short time frame between testing sessions used in the questionnaire was chosen for two reasons. First, as intention is proposed to be a better predictor of behaviour when the measurements are closer together (Fishbein & Ajzen, 1975), one week seemed more appropriate than a 4- or 8-week study, for example. A second reason is that self-reporting of behaviour should be easier, and more accurate (Craig & Russell, 2002) when reviewing exercise of only a week ago as compared to a longer time period. A high level of accuracy and specificity is critical to a properly designed study assessing the TPB (Ajzen, 2002a).

During the first round of data collection, participants completed one of two versions of a questionnaire that assessed demographic variables (age, sex), measures of the TPB constructs, and a measure of exercise behaviour in both a structured and unstructured setting. During the second round of data collection, only the exercise behaviour of the participants was assessed, in both a structured and unstructured setting, using the same assessment tool that was used in the first assessment (See Figure 3). Given that participants needed to have completed both rounds of data collection in order for the information to be applicable to this study, only those who completed questionnaires from round one were asked to participate in round two.

A unique feature of this study was an attempt to increase correspondence between the assessment of exercise outcomes and the TPB constructs. When assessing behaviour, Ajzen (2002a) recommends that TPB questionnaires have high levels of both specificity and consistency in order for TPB constructs to have significant levels of predictive ability for that behaviour. Typically, participants are asked in any number of ways, to specifically identify their level of exercise participation (such as their

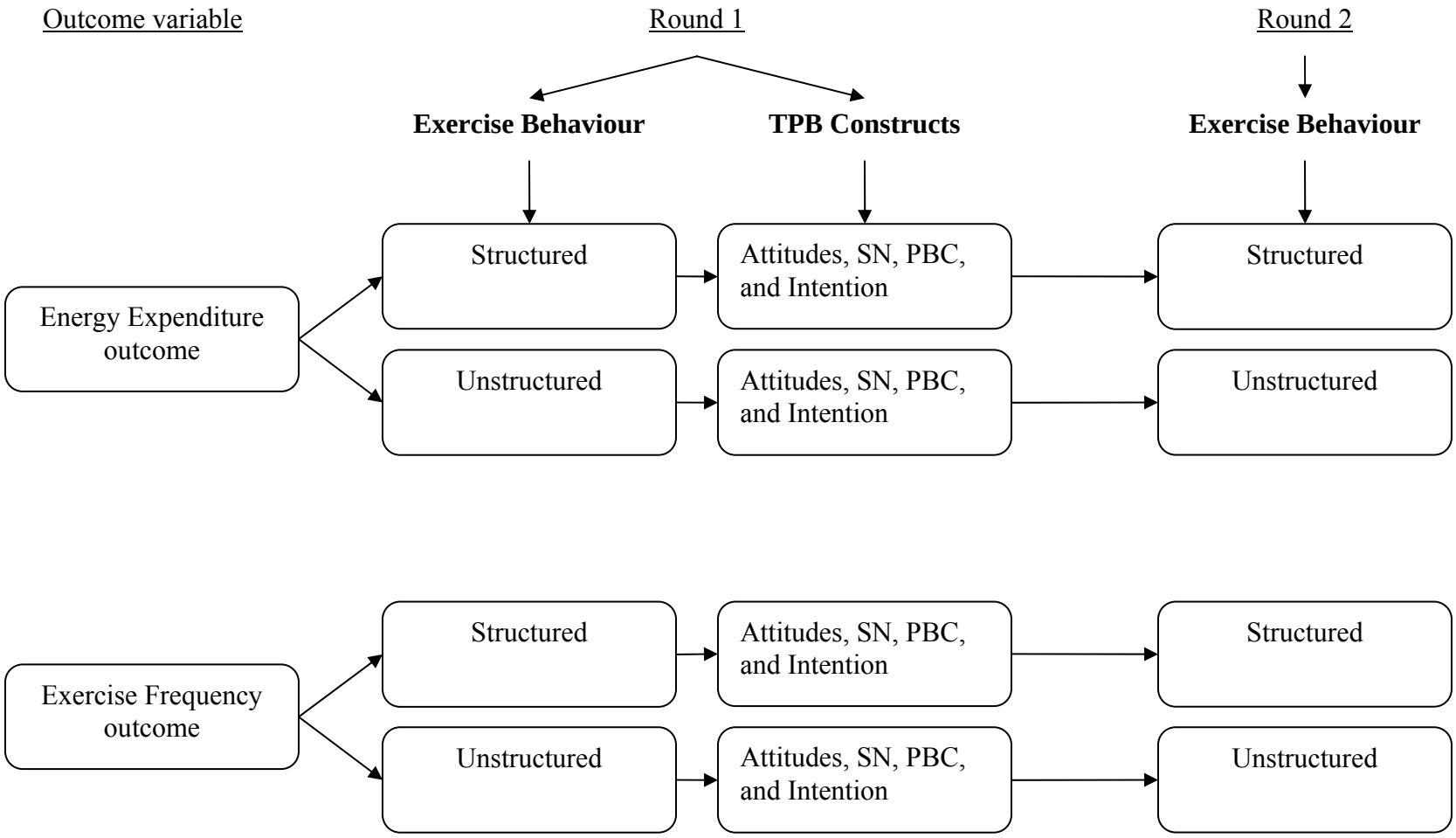

Figure 3. Diagrammatic representation of data collection schedule.

frequency over the past week, month, or year, as an average or absolute number), yet when the participant is asked about their intention to exercise, the question is often based on a predetermined frequency of exercise. As one example, in the Bryan and Rocheleau (2002) study mentioned earlier, participants were asked to identify how often they exercised in the past 3 months (responses ranged from never (1) to often (7), the average number of days per week in the past 3 months (0 days to 7 days), and the number of days exercising in the past 7 days (0 days to seven days). However, when intention was assessed, one of the items asked the participants intention to exercise three times per week during the next 3 months. Though many variations of this approach exist, this is the predominant method of applying the TPB to exercise by researchers. However, this approach technically violates the principle of compatibility which "requires that all other constructs… be defined in terms of exactly the same elements" (Ajzen, 2002a, p. 2). To rectify this shortcoming of previous studies in this study, participants used a self-identified exercise frequency on which to base their subsequent responses for the other TPB constructs. Specifically, if an individual exercised five times in the previous week, questionnaire items assessing attitude, subjective norms, PBC, and intention would be based on exercising five times a week.

A second unique feature of this study was that instead of only using an exercise frequency (see Appendix B) some participants were instructed to use an energy expenditure outcome (see Appendix C) to answer questions. If an accurate perception of energy expenditure is possible, this approach may be a more specific and, as such, a more advantageous mode of assessing the TPB constructs. To my knowledge, this is the only study in the TPB literature that utilized energy expenditure as an exercise outcome.

Further, both the structured and unstructured settings contained the two types of exercise outcome measures.

2.3 Measures

2.3.1 Exercise Behaviour

The primary questionnaire to assess physical activity was the Modifiable Activity Questionnaire (MAQ) (Kriska & Bennett, 1992; Kriska, Knowler, LaPorte et al., 1990). The MAQ is a self-report measure of leisure-time physical activity behaviour that has successfully been used elsewhere in the physical activity literature (e.g., Vuillemin et al., 2000). Although the MAQ was intended for recall of a whole year this study was interested only in the previous week. As noted above, however, data collection was actually nine days apart, not seven. Participants were instructed to recall only their participation in exercise for the seven days following the first round of data collection, which was the time period used in assessing attitudes, subjective norms, PBC, and intention. Therefore, to help ensure compatibility between questions from rounds one and two, any participation in exercise for the two additional days was *not* to be recorded in the MAQ.

The MAQ provides the opportunity to look at exercise as both a level of energy expenditure (expressed as kilocalories per kilogram of body weight per day, or KKD) as well as a frequency of behaviour (expressed with a corresponding intensity and duration). This study used both forms of outcome variables for exercise behaviour, resulting in two separate versions of the questionnaire. One version looked at energy expenditure as a behavioural outcome and one version used an exercise frequency (i.e., frequency with a corresponding duration and intensity) as a behavioural outcome. The

decision to use both types of outcomes was predicated upon both substantive and methodological concerns. Data created from an "energy expenditure" outcome allows the researcher to see if the participants are exercising at a level that is sufficient to obtain important health benefits. It also allows the participant to disregard the method of *how* he or she exercises and, instead, pay attention to the overall energy expenditure level. In other words, the intention-behaviour relationship will not be compromised because a participant chooses, from week-to-week, to exercise with a different *frequency* but a similar *energy expenditure level*. Recent guidelines (Health Canada, 2000) suggest that this approach to exercise (i.e., *how* individuals gets their exercise is less important than *how much* exercise they get) is the ideal model to follow. However, studying exercise behaviour so that "exercise frequency" is the outcome also is important. An "exercise frequency" definition may allow for a more tangible level of specificity when asking questions about the TPB. Ajzen (2002a) points out that behaviour clearly defined with much specificity and individualization is important in order to fairly investigate the application of the theory's constructs.

The questionnaire was administered twice during each testing period, once for structured exercise and once for unstructured exercise, with half of the participants receiving the "energy expenditure" version and half receiving the "exercise frequency" version. Also, for both versions of the questionnaire, half of the questionnaires began asking about exercise in a structured setting while half began by asking about exercise in an unstructured setting. This was done to ensure that there was no bias in the data based on an order effect. A definition of structured and unstructured exercise was provided to

the participants, verbally and in written form, before they began. For this study, structured exercise was defined using the following parameters:

- It is **purposeful** in that it is done for the purpose of improving or maintaining: a) cardiovascular strength or endurance and/or, b) muscle strength or tone and/or, c) general health;
- The time, place, intensity, frequency, and nature of the exercise are **predetermined** by someone else, **not** the individual or their exercise group.

Unstructured exercise subsequently contained the following parameters:

- It is **purposeful** in that it is done for the purpose of improving or maintaining: a) cardiovascular strength or endurance and/or, b) muscle strength or tone and/or, c) general health;
- The time, place, intensity, frequency, and nature of the exercise are determined by the **individual** and/or their **exercise partners**.

Note that, as mentioned earlier, exercise is the behaviour being assessed and not physical activity. It was deemed that the vagueness of physical activity would detract from the attempt, in this study, to provide a specific and tangible behaviour to more appropriately test the theory.

2.3.2 TPB Constructs

Attitude – According to Ajzen (2002a), construction of an attitude toward the behaviour measure in the TPB should reflect two criteria. The first criterion is that the measure should use a standard attitude scaling procedure. A semantic differential scale, where individuals respond on a scale anchored by two opposing adjectives, is the most

common. Second, the measure should reflect the qualitative aspects of evaluation and should be separated into two components – instrumental and affective. The instrumental, or evaluative, component is proposed to represent the benefits and costs associated with a given behaviour while the affective component represents the positive or negative association with the behaviour or outcome of the behaviour (Ajzen, 1991). To this end, attitude was measured using bipolar adjective scales that tap both evaluative (useful-useless, harmful-beneficial, bad-good) and affective components (enjoyable-unenjoyable, boring-fun, pleasant-unpleasant) of attitude. Therefore, those who find exercise and their related outcomes to be both beneficial and pleasant or enjoyable will form the most favourable attitudes towards exercise. To counteract possible response sets, positive and negative anchors were counterbalanced.

The measure on the "energy expenditure" version of the questionnaire was introduced with the phrase, *"For me to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week is…"* with Table 1 referring to the results of the participant's previously completed MAQ. The "exercise frequency" version of the questionnaire was introduced with the phrase *"For me to exercise at least ___ times in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 is…".* The blank space was filled in by the individual participant with the frequency value obtained from their score on the MAQ (i.e., Table 1). Note: The remainder of the "Method" section will use the structured sections of the "energy expenditure" version of the questionnaire as examples.

Subjective Norms – In line with Ajzen's (2002a) suggestions for constructing a TPB questionnaire, several questions were used to obtain a measure of subjective norms. Items were included that have injunctive qualities (i.e., indicating whether important others approve or disapprove of the behaviour) as well as those designed to reflect descriptive norms (i.e., reflecting whether important others also perform the behaviours in question). Items with an injunctive quality will include:

"People most important to me think I
Should _____ : _____ : _____ : _____ : _____ : _____ : _____ Should Not
exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week."

"It is expected of me that I exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week."
Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

"Those people in my life whose opinion I value would
Disapprove _____ : _____ : _____ : _____ : _____ : _____ : _____ Approve
*of me exercis*ing *in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week."*

Items written to capture descriptive norms included:

"People most important to me will exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week."
Completely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Completely True

"Those people in my life whose opinion I value are
Active _____ : _____ : _____ : _____ : _____ : _____ : _____ Not Active
in a structured setting at an energy expenditure level similar to or greater than *the one that I reported in Table 1 for the previous week."*

It is worth noting that a direct measure such as this is consistent with the TPB (Ajzen, 1991), although a belief-based measure is also used sometimes. A belief-based measure would ask a respondent about how specific referent groups (e.g., parents, brothers/sisters, close friends) feel about the participant engaging in a given behaviour

(exercise, for example) and the participant's motivation to comply (Ajzen, 1988). The scores from each referent group would then be combined to produce a single subjective norm score. This information would theoretically give insight into the participants' underlying cognitions concerning their expressed attitudes, subjective norms, and perceptions of control, though this would only be relevant to the salient or accessible beliefs (Ajzen, 2002a).

The direct measure was chosen over the belief-based measure for a number of reasons. First, by providing a pre-selected list of referent groups for the participants to answer makes the assumption that these referent groups are, in fact, important to the participant. In the case that some of the referent groups are not important, but the questionnaire requires them to answer, their forced answer may attenuate the subjective norm-intention relationship. Conversely, wording the question "Most people important to me…" requires the participant to self-identify their own important and influential referent groups. Finally, the direct measure is less time consuming, and thus reduces participant burden.

Perceived Behavioural Control – According to Ajzen (2002a), the measure to assess perceived behavioural control should contain items that capture both self-efficacy (i.e., likelihood that the individual can do the behaviour) and controllability (i.e., individual's beliefs of control over the behaviour in question). To reflect self-efficacy, the items used included:

"For me to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week would be"

Easy _____ : _____ : _____ : _____ : _____ : _____ : _____ Difficult

"If I wanted to I could exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week"
Definitely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely True

To assess controllability, the following items were used:

"How much control do you believe you have over exercising in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week?"
No Control _____ : _____ : _____ : _____ : _____ : _____ : _____ Complete Control

"It is mostly up to me whether or not I exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week?"
Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

Intention – The following three items were used to assess behavioural intentions:

"I intend to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week"
Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

"I will try to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week"
Definitely True _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely False

"I plan to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in Table 1 for the previous week"
Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

As per Ajzen's suggestions (2002a), in the final questionnaire the items for a given construct were separated and interspersed with items for the other constructs. Also, the set of items for each construct were assessed for internal consistency before collapsing.

2.4 Analyses

After the data had been collected and entered, outliers were cleaned from the database using information from boxplot graphs. An exercise value that was more than 1.5 times the inter-quartile range was considered an outlier and was removed from further analysis. The items of the "clean" data set were then put through a set of reliability analyses to assess internal consistency and to justify whether or not to collapse the components of each variable into one (e.g., collapsing self-efficacy and controllability into PBC). T-tests also were performed between males and females and between class sections to determine if any significant differences were present. The reliability analyses were performed for both structured and unstructured settings and for both the frequency and energy expenditure versions of the questionnaire. Next, a series of hierarchical regression analyses (HRA) were run to test the effects of the TPB constructs on exercise intention and behaviour in both the structured and unstructured exercise settings. A regression analysis is a statistical method of predicting the value of one variable (dependent variable) based on the value(s) of one or more other variables (independent variable(s)) (Vincent, 1999). An HRA, as the name suggests, is a regression technique in which the order of inclusion of the independent variables is specified by the researcher. When using the TPB, it is important to be able to enter variables in a specific order because it affords the opportunity to assess the significance of PBC above and beyond the other constructs.

For each of the two data sets (one data set for behaviour defined by "energy expenditure" and one data set for behaviour defined as "exercise frequency"), two sets of two analyses were done – one set for the structured setting and one set for the

unstructured setting. In the first set of HRA, intention was regressed on attitude and norm (as a block) on step 1 followed by PBC on step 2. In the second HRA, exercise behaviour in the structured setting was regressed on intention on step1 followed by PBC on step 2 to determine if any additional variance in exercise behaviour could be directly accounted for by PBC. The constructs of attitude and subjective norms were not included in this second HRA because, unlike PBC, the theory of planned behaviour proposes them to *not* have a direct effect on behaviour. These HRA were then repeated with the unstructured exercise setting data. A comparison of the results of the two sets of HRA would give an indication of whether or not type of exercise setting (i.e., structured versus unstructured) has a moderating effect on either intention to exercise or actual exercise behaviour.

Chapter 3

Results

For ease of presentation, the results are presented in several sections. There are two main sections – intention and exercise behaviour, which capture the two key dependent variables in this study. Within each of these sections are two further subheadings - structured and unstructured settings. Finally, the subheadings of unstructured and structured settings are each separated into energy expenditure and exercise frequency sections. In both the intention and exercise behaviour sections, demographic information, bivariate correlations, and the results from the regressions are provided for both types of setting (i.e., structured versus unstructured) and for both types of exercise behaviour (i.e., energy expenditure versus exercise frequency).

Given the wide array of results that will be presented, an overview has been provided at the outset. Figures 4 and 5 provide a schematic overview of the findings for intention and exercise behaviour, respectively.

3.1 Intention

As mentioned previously, students from a first-year university class were recruited for this study. Although 475 students were enrolled and registered in the class at the time that data collection was scheduled, only 225 provided informed consent and completed the questionnaires. Unfortunately, class attendance is not taken in classes of

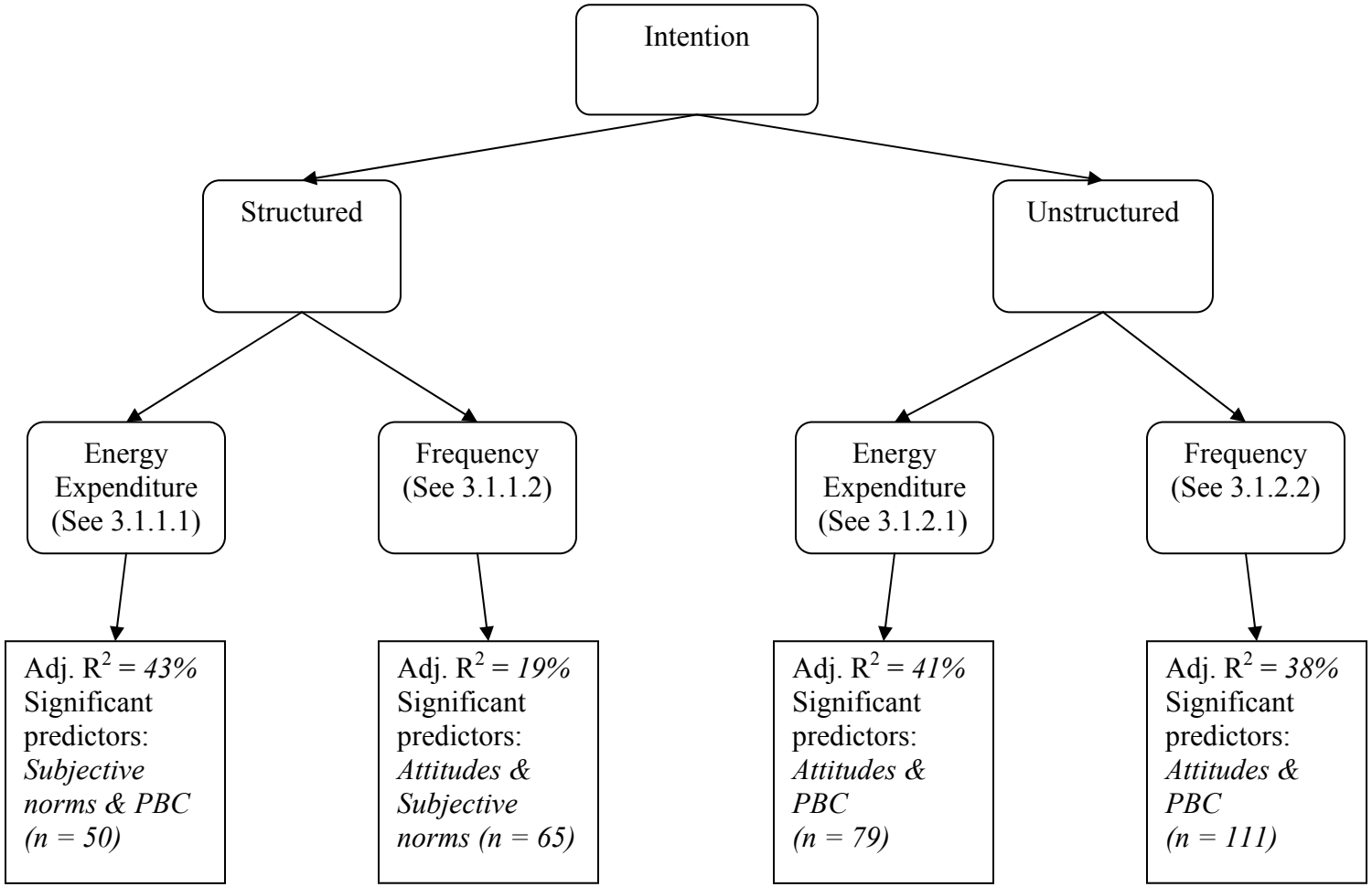

Figure 4: Schematic overview of Intention results.

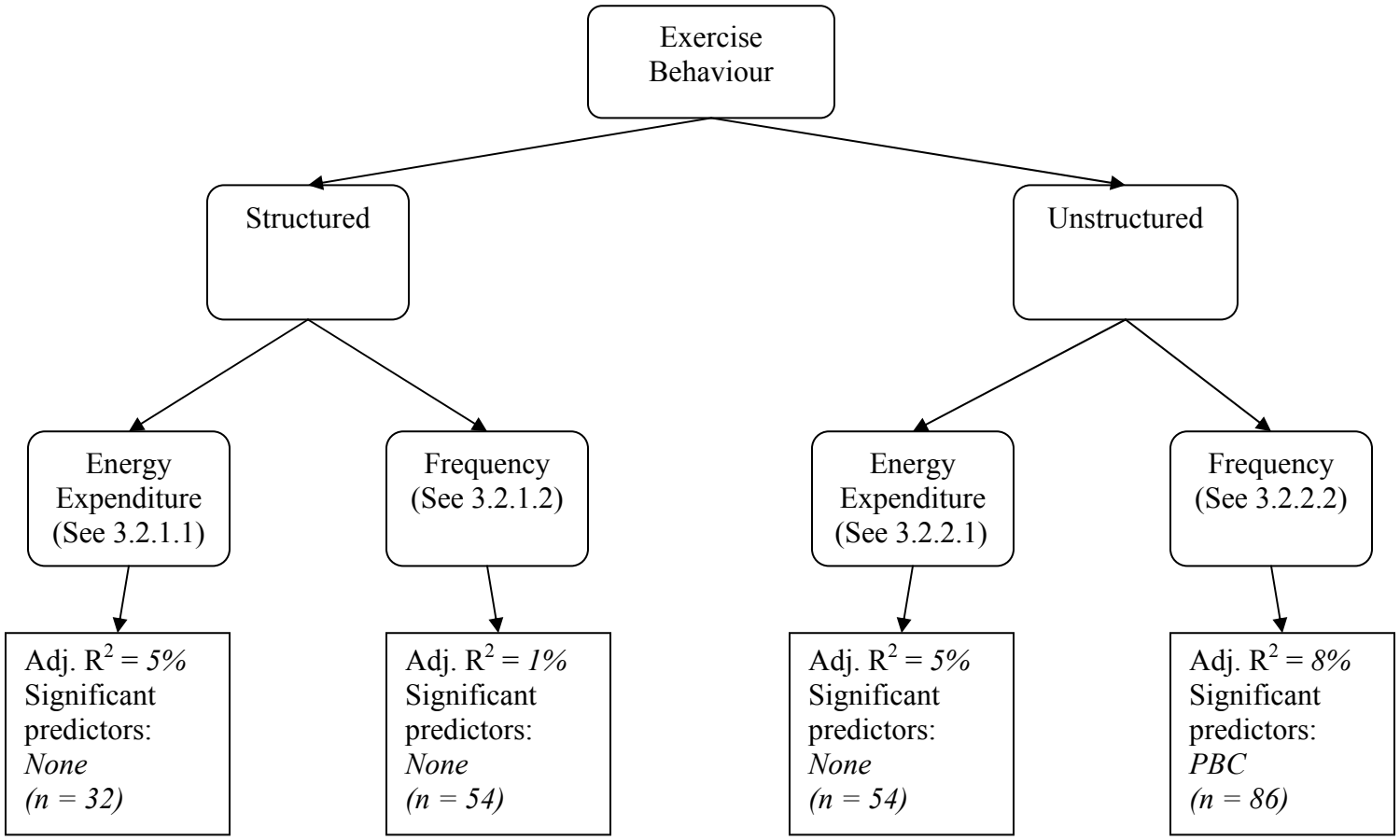

Figure 5: Schematic overview of Exercise Behaviour results.

this size, so it is not possible to determine what percentage of those in attendance completed the questionnaire.

Before proceeding to the analysis, the exercise data were checked for outliers, where an outlier is defined as any data point that is distinct or deviant from the other data points (Pedhazur, 1997). A box plot graph revealed several outliers and yielded a final sample of 207. This sample was comprised of 65 males and 142 females with an average age of 20.02 years.

To assess the internal consistency reliabilities of the TPB constructs, Cronbach's alphas were computed (Cronbach, 1951). As can be seen in Table 3.1, the internal consistencies for one of the variables (PBC = .44) was outside the adequate internal consistency range (i.e., .50 - .70) suggested by Nunnally and Bernstein (1994). In order to increase the reliability of this TPB variable, a poor item (i.e., low item-total correlation) was removed from the subscale. To improve the reliability of the PBC subscale, within the exercise frequency version of the questionnaire in the structured setting, the item *"For me to exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 would be"* (Easy/Difficult) was removed and the reliability improved to .61. As this new alpha value fell within the adequate range suggested by Nunnally and Bernstein (1994), the revised PBC subscale was deemed acceptable to be used in the subsequent analyses.

An identical process was used to assess internal reliability consistencies for the unstructured setting. As noted in Table 3.2, all of the variables fell within the adequate

Table 3.1

Descriptives and Internal Reliability Consistencies for the TPB constructs in the Structured Setting (n = 115)

	STRUCTURED SETTING					
Variable	# of items	Scale	Mean score[1]	Range	Alpha	
					Energy expenditure	Exercise frequency
Intention	3	1 – 7	18.8 (6.3)	4 – 21	.90	.73
Attitude	6	1 – 7	34.1 (5.7)	20 – 42	.85	.68
Subjective Norms	5	1 – 7	23.9 (4.8)	9 – 35	.71	.65
PBC	4	1 – 7	20.3 (5.1)	7 – 28	.71	.61*

Note: The '*' indicates that an item was removed from this subscale in order to improve reliability.

[1] The mean scores presented in Tables 3.1 and 3.2 are composite scores of all questionnaire items for that variable. The value in brackets represents the mean score on a scale from 1 – 7.

Table 3.2

Descriptives and Internal Reliability Consistencies for the TPB constructs in the Unstructured Setting (n = 190)

UNSTRUCTURED SETTING						
					Alpha	
Variable	# of items	Scale	Mean score	Range	Energy expenditure	Exercise frequency
Intention	3	1 – 7	18.3 (6.1)	5 – 21	.80	.84
Attitude	6	1 – 7	36.9 (6.2)	12 – 42	.77	.84
Subjective Norms	5	1 – 7	21.2 (4.2)	4 – 28	.57	.68
PBC	4	1 – 7	18.8 (4.7)	11 – 21	.68	.61

range suggested by Nunnally and Bernstein (1994), and as such, all were deemed acceptable for use in subsequent analyses.

Bivariate correlations between the subscales of the TPB constructs used in the main analyses were computed for the structured and unstructured settings, respectively. A visual inspection of the bivariate correlations in both the structured and unstructured settings revealed that all the correlations were well below the $r = .80$ value that has been used to indicate evidence of multicollinearity (cf. Licht, 1995). Multicollinearity is a condition where one or more predictor variables in a regression model are highly correlated resulting in a difficulty in interpreting relative effects of each individual predictor (Vincent, 1999). Given the apparent lack of multicollinearity, all variables were retained for the main analyses (see Tables 3.3 and 3.4).

To determine if any significant differences were present between males and females or between class sections, independent t-tests were performed before continuing with any other analyses. In terms of exercise levels, no significant differences were found between males and females ($p > .05$), nor were there differences found between the two class sections ($p > .05$). T-tests also were run for the TPB variables and no significant differences were found between males and females with the exception of attitude in the unstructured setting ($p < .04$), with females reporting a more positive attitude towards exercising at a given level in an unstructured setting. Given that there was only one significant difference in one setting, male and female data were collapsed for the subsequent analyses.

As noted previously, intention to exercise was examined in two different settings – structured ($n = 115$) and unstructured ($n = 190$).

Table 3.3

Inter-item Correlations among TPB Constructs in the Structured Setting

	1	2	3	4
1. Intention	1			
2. PBC	.201*	1		
3. Attitude	.105	.495**	1	
4. Subjective Norms	.339**	.458**	.452**	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 3.4

Inter-item Correlations among TPB Constructs in the Unstructured Setting

	1	2	3	4
1. Intention	1			
2. PBC	.475**	1		
3. Attitude	.479**	.255**	1	
4. Subjective Norms	.308**	.177*	.393**	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

3.1.1 Structured Setting

In the structured exercise setting, intention to exercise was examined from two perspectives – energy expenditure and exercise frequency.

3.1.1.1 Energy Expenditure

Of the 115 individuals who had exercised in a structured setting, 50 completed the questionnaire assessing energy expenditure. To determine the unique contribution of the TPB constructs to predict intention to exercise in the next week at an energy expenditure level similar to or greater than the previous week, a hierarchical regression analysis was done wherein attitude and subjective norms were entered at the first step, followed by perceived behavioural control (PBC) at the second step.

The results from the first step of the analysis revealed that attitude and subjective norms were significant predictors of the participants' intention to be active in a structured setting during the next week at an energy expenditure level similar to the one they reported for the previous week, F (2, 48) = 11.50, $p < .001$. The two predictors accounted for 30% (adjusted) of the total variance. The results from the second step revealed that perceived behavioural control added significant variance over and above the contribution made by attitudes and subjective norms (see Table 3.5). The adjusted R^2 improved significantly from .30 to .43, F (1, 49) = 13.80, $p < .001$, which represented a 13% increase in the amount of variance explained. An examination of the beta weights for the whole model revealed that both subjective norms ($\beta = .41$, $p < .001$) and PBC ($\beta = .41$, $p < .001$) were significant predictors of intention in this setting.

Given that the independent variables were significantly correlated in this situation, semipartial correlations also were computed to determine the unique

Table 3.5

Summary of Hierarchical Regression Analysis of TPB Constructs Predicting Intention via Energy Expenditure in a Structured Setting (n = 50)

Variable	R	R^2	AdjR^2	Adj R^2 change	Sig F change	Sig F model
Step 1[a]	.57	.32	.30	.30	.001	.001
Step 2[b]	.68	.47	.43	.13	.001	.001

aPredictors: Attitude, Subjective Norms

bPredictors: PBC

Note – Beta weights for the predictors in the overall model are as follows:

Attitude = .04

Subjective Norms = .41

PBC = .41

contribution of each predictor to the total variance of intention. In semipartial correlations, the contribution of all other predictor variables is removed from the dependent variable before the correlation of interest is computed (Pedhazur, 1997). Results using semipartial correlations revealed that subjective norms and PBC contributed 15% and 14% of unique variance towards the prediction of intention, respectively.

3.1.1.2 Exercise Frequency

Of the individuals exercising in a structured setting, 65 completed a questionnaire assessing exercise frequency. As was the case for energy expenditure, to determine the unique contribution of the TPB constructs to intention to be active using the same exercise frequency during the next week as was reported in the previous week, a hierarchical regression analysis was done wherein attitude and subjective norms were entered at the first step, followed by perceived behavioural control at the second step.

The results from the first step of the analysis showed that the combination of attitudes and subjective norms significantly predicted intention to be active in a structured setting during the next week using an exercise frequency similar to the one they reported for the previous week F (2, 63) = 8.15, $p < .001$. The two predictors accounted for 18% (adjusted) of the total variance. The results from the second step, shown in Table 3.6, revealed that perceived behavioural control did not add any significant additional variance over and above the contribution made by attitude and subjective norms, F (1, 64) = 5.97, $p > .05$. When considering the whole model, an examination of the beta weights revealed that both attitudes ($\beta = .31$, $p < .011$) and

Table 3.6

Summary of Hierarchical Regression Analysis of TPB Constructs Predicting Intention via Exercise Frequency in a Structured Setting (n = 65)

Variable	R	R^2	AdjR^2	Adj R^2 change	Sig F change	Sig F model
Step 1[a]	.45	.21	.18	.18	.001	.001
Step 2[b]	.47	.22	.19	.01	.229	.001

aPredictors: Attitude, Subjective Norms

bPredictors: PBC

Note – Beta weights for the predictors in the overall model are as follows:

Attitude = .31

Subjective Norms = .32

PBC = -.14

subjective norms (β = .32, $p < .008$) were significant predictors of intention in this setting. Semipartial correlations revealed that both attitudes and subjective norms accounted for 9% of unique variance in predicting intention to exercise.

3.1.2 Unstructured Setting

In the unstructured setting, the prediction of intention also was examined from an energy expenditure as well as an exercise frequency perspective.

3.1.2.1 Energy Expenditure

Of the 190 individuals who exercised in the unstructured setting, 79 completed the energy expenditure version of the questionnaire. To determine the amount of unique variance of the TPB variables in predicting intention, a hierarchical regression analysis was performed with attitude and subjective norms entered at the first step followed by PBC at the second step. The results for the first step of the analysis revealed that attitude and subjective norms were significant predictors of an individual's intention to exercise at a level similar to the one reported for the previous week, F (2, 77) = 5.97, $p <$ .004, with attitude and subjective norms accounting for 11% (adjusted) of the total variance in intention. When PBC was added at the second step, a significant amount of unique variance was added to the prediction model. The adjusted R^2 improved 30%, F (1, 78) = 19.40, $p < .001$, from 11% to a total of 41% when PBC was added to the model (see Table 3.7). An examination of the beta weights for the entire model showed that attitude (β = .24, $p < .010$) and PBC (β = .57, $p < .001$) were significant predictors of intention in this setting. Further, semipartial correlations indicated that, while both

Table 3.7

Summary of Hierarchical Regression Analysis of TPB Constructs Predicting Intention via Energy Expenditure in an Unstructured Setting (n = 79)

Variable	R	R^2	AdjR^2	Adj R^2 change	Sig F change	Sig F model
Step 1[a]	.37	.13	.11	.11	.004	.004
Step 2[b]	.66	.43	.41	.30	.001	.001

aPredictors: Attitude, Subjective Norms

bPredictors: PBC

Note – Beta weights for the predictors in the overall model are as follows:

Attitude = .24

Subjective Norms = -.01

PBC = .57

significant, PBC was a much stronger predictor of intention than attitudes. The results revealed that PBC contributes 30% of unique variance in predicting intention to exercise in a structured setting compared to 5% of unique variance contributed by attitudes.

3.1.2.2 Exercise Frequency

There were 111 of 190 individuals who reported exercising in the unstructured setting who completed a questionnaire assessing exercise frequency. In line with the previous analyses, a hierarchical regression analysis was performed with attitude and subjective norms entered at the first step and PBC entered at the second step. The results, presented in Table 3.8, revealed that attitude and subjective norms were significant predictors of an individual's intention to exercise the same number of times as reported for the previous week, F (2, 109) = 25.04, $p < .001$. Together, attitude and subjective norms were able to account for 30% (adjusted) of the variance in intention. The results from the second step revealed that PBC also contributed a significant unique amount of variance to the prediction model, F (1, 110) = 23.80, $p < .001$. PBC added an additional 8% to the total variance in predicting intention resulting in an overall total of 38% of the variance being accounted for by the three predictors. An analysis of the reported beta weights for the overall model indicated that attitudes ($\beta = .33$, $p < .001$) and PBC ($\beta = .31$, $p < .001$) were once again significant predictors of intention in the unstructured setting. The results from the semipartial correlations revealed that attitudes and PBC each contributed 8% of unique variance in predicting intention.

3.2 Exercise Behaviour

As noted above, the second main outcome variable of interest in this study was

Table 3.8

Summary of Hierarchical Regression Analysis of TPB Constructs Predicting Intention via Exercise Frequency in an Unstructured Setting (n = 111)

Variable	R	R^2	AdjR^2	Adj R^2 change	Sig F change	Sig F model
Step 1[a]	.56	.32	.30	.30	.001	.001
Step 2[b]	.63	.40	.38	.08	.001	.001

aPredictors: Attitude, Subjective Norms

bPredictors: PBC

Note – Beta weights for the predictors in the overall model are as follows:

Attitude = .33

Subjective Norms = .17

PBC = .31

exercise behaviour. For exercise behaviour, responses from 153 participants were available for analysis. The decline from 207 participants available for the previous analysis was due to the fact that participants' exercise behaviour scores had to be matched to the intention scores taken the previous week. Owing to the fact that a number of participants from the first testing day were absent on the second testing day, only 153 complete data sets were available for analysis. In terms of the final sample for examining exercise behaviour, 104 were female and 49 were male.

Bivariate correlations between intention, PBC, and the behaviour outcome variables of exercise frequency and energy expenditure for the structured settings are provided below in the Tables 3.9 and 3.10, respectively. Attitude and subjective norms are not included because they are not proposed to be direct predictors of behaviour in the TPB.[2] An inspection of the correlation coefficient between intention and PBC indicates that there is no evidence of multicollinearity and thus both variables are included in further analyses. Tables 3.11 and 3.12 provide the bivariate correlations between intention, PBC, and exercise behaviour for the unstructured setting. As was the case for the structured setting, the correlation coefficient between intention and PBC for the unstructured setting gave no indication of the presence of multicollinearity and thus both are included in subsequent analyses.

As was the case in the intention section above, exercise behaviour was examined in both the structured setting (n = 86) and the unstructured setting (n = 140).

[2] Although attitudes and subjective norms could have been included to test this assumption, issues concerning power prevented this possibility.

Table 3.9

Inter-item Correlations among Intention, PBC, and Exercise Frequency in the Structured Setting

	1	2	3
1. Exercise Frequency	1		
2. Intention	.085	1	
3. PBC	.084	.296*	1

* Correlation is significant at the 0.05 level (2-tailed).

Table 3.10

Inter-item Correlations among Intention, PBC, and Energy Expenditure in the Structured Setting

	1	2	3
1. Energy Expenditure	1		
2. Intention	.118	1	
3. PBC	.077	.296*	1

* Correlation is significant at the 0.05 level (2-tailed)

Table 3.11

Inter-item Correlations among Intention, PBC, and Exercise Frequency in Unstructured Setting

	1	2	3
1. Exercise Frequency	1		
2. Intention	.084	1	
3. PBC	.267**	.599**	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 3.12

Inter-item Correlations among Intention, PBC, and Exercise Expenditure in Unstructured Setting

	1	2	3
1. Energy Expenditure	1		
2. Intention	.076	1	
3. PBC	.177*	.599**	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

3.2.1 Structured setting

Exercise behaviour was measured in the structured setting using two different outcome measures – energy expenditure and exercise frequency.

3.2.1.1 Energy expenditure

Of the 86 individuals who reported exercising in the structured setting, only 32 completed questionnaires that used energy expenditure as the outcome measure. To determine the unique amount of variance provided by both intention and PBC, a hierarchical regression analysis was performed with intention entered at step one followed by PBC at the second step. The results from the first step showed that intention did not significantly predict exercise behaviour, F (1, 31) = 2.58, $p > .05$. When PBC was added at the second step, no significant variance was added to the equation, F (1, 31) = 1.79, $p > .05$ (see Table 3.13).

3.2.1.2 Exercise Frequency

Of the 86 individuals reporting exercise in the structured setting, 54 completed questionnaires assessing exercise frequency. To determine the unique contribution made by intention and PBC to the prediction of the number of times an individual would exercise, a hierarchical regression analysis was performed with intention entered at the first step and PBC entered at the second step. As was the case in the energy expenditure analysis, neither variable was able to account for any significant amount of variance. Intention, F (1, 53) = 0.03, $p > .05$, and PBC, F (1, 53) = 1.29, $p > .05$, combined for a total of 1% of explained variance (see Table 3.14).

3.2.2 Unstructured Setting

Finally, the prediction of exercise behaviour also was examined in the

Table 3.13

Summary of Hierarchical Regression Analysis of Intention and PBC Predicting Behaviour via Energy Expenditure in a Structured Setting (n = 32)

Variable	R	R^2	AdjR^2	Adj R^2 change	Sig F change	Sig F model
Step 1[a]	.28	.08	.05	.05	.119	.119
Step 2[b]	.33	.11	.05	.00	.322	.184

aPredictors: Intention

bPredictors: PBC

Note – Beta weights for the predictors in the overall model are as follows:

Intention = .46

PBC = -.25

Table 3.14

Summary of Hierarchical Regression Analysis of Intention and PBC Predicting Behaviour via Exercise Frequency in a Structured Setting (n = 54)

Variable	R	R^2	AdjR^2	Adj R^2 change	Sig F change	Sig F model
Step 1[a]	.03	.00	-.02	-.02	.858	.858
Step 2[b]	.22	.05	.01	.03	.117	.285

aPredictors: Intention

bPredictors: PBC

Note – Beta weights for the predictors in the overall model are as follows:

Intention = -.03

PBC = -.22

unstructured setting using both outcome measures as described above.

3.2.2.1 Energy Expenditure

Of the 140 individuals reporting exercise participation in an unstructured setting, 54 completed a questionnaire relating to energy expenditure. To determine the contribution of intention and PBC in the prediction of exercise behaviour via the amount of energy the individual expended during the previous week in an unstructured setting, a hierarchical regression analysis was performed. Intention was entered at the first step and the results indicated that only a small (4%), nonsignificant amount of variance in behaviour was accounted for by intention, F (1, 53) = 2.99, $p > .05$. After entering PBC into the regression equation in the second step, there was only a change of 1% in the amount of variance accounted for by the predictor, F (1, 53) = 2.37, $p > .05$ (see Table 3.15).

3.2.2.2 Exercise Frequency

Finally, 86 of 140 individuals in the unstructured setting completed a questionnaire assessing exercise frequency. Once again, a hierarchical regression analysis was performed wherein intention was entered at the first step and PBC entered at the second step. Results, which are presented in Table 3.16, revealed that intention did not significantly predict the number of times an individual would exercise, F (1, 85) = 0.07, $p > .05$. However, in this setting, PBC was able to add a significant amount of unique variance in the prediction of exercise behaviour, F (1, 85) = 4.52, $p < .014$. Specifically, PBC added 9% (adjusted) to the variance in an individual's exercise behaviour as measured by exercise frequency. An analysis of the beta weights showed a significant value for PBC ($\beta = .37$, $p < .001$) in the prediction of exercise behaviour.

Table 3.15

Summary of Hierarchical Regression Analysis of Intention and PBC Predicting Behaviour via Energy Expenditure in an Unstructured Setting (n = 54)

Variable	R	R^2	AdjR^2	Adj R^2 change	Sig F change	Sig F model
Step 1[a]	.23	.05	.04	.04	.090	.090
Step 2[b]	.29	.08	.05	.01	.196	.104

aPredictors: Intention

bPredictors: PBC

Note – Beta weights for the predictors in the overall model are as follows:

Intention = .07

PBC = .24

Table 3.16

Summary of Hierarchical Regression Analysis of Intention and PBC Predicting Behaviour via Exercise Frequency in an Unstructured Setting (n = 86)

Variable	R	R^2	AdjR^2	Adj R^2 change	Sig F change	Sig F model
Step 1[a]	.03	.00	-.01	-.01	.788	.788
Step 2[b]	.31	.10	.08	.09	.004	.014

aPredictors: Intention

bPredictors: PBC

Note – Beta weights for the predictors in the overall model are as follows:

Intention = -.22

PBC = .37

It also was interesting to note that exercise behaviour declined from round one to round two. Concerning energy expenditure, 59% of the participants decreased their exercise output from round one to round two. Similarly, 54% of those participants who completed an exercise frequency questionnaire decreased the number of times they exercised from round one to round two.

In summary, the results of this study did not provide support for the main hypothesis that PBC would be more predictive of intention and behaviour in the structured setting. In fact, the opposite was true for the PBC – intention relationship. Further, no consistent relationship was found between PBC and exercise behaviour. In terms of the other predictors, partial support was found for the prediction that attitudes would be more predictive in the unstructured setting. Attitudes proved to be a significant predictor with both outcome measures in the unstructured setting, but significant with only one outcome measure in the structured setting. Finally, while subjective norms were not predicted to be moderated by type of setting, results showed subjective norms as having a strong predictive presence in the structured setting but not in the unstructured setting.

Chapter 4

Discussion

The present study examined the application of the theory of planned behaviour (TPB) to two different exercise settings – structured versus unstructured – to determine if type of setting might moderate the relationship between the TPB constructs and intention, and exercise behaviour.

In terms of predicting intention, the results revealed no support for the hypothesis that PBC would be more predictive in the structured versus unstructured setting using either outcome measure - energy expenditure or exercise frequency. In the case of energy expenditure, PBC contributed significant variance over and above attitudes and subjective norms in both the structured and unstructured setting. In the structured setting, entering PBC added 13% unique variance to the predictive equation. In the case of the unstructured setting, adding PBC to the equation contributed an additional 30% of unique variance over and above that added by attitude and subjective norms.

The results related to predicting intention using exercise frequency also provided no support for the hypothesis. In fact, the results for the exercise frequency outcome were in the opposite direction to what was predicted. Specifically, it was found that in the structured setting that PBC did not add any significant variance over and above that contributed by attitude and subjective norms. In the unstructured setting, however, the

entry of PBC added 8% unique variance to the prediction of exercise frequency intention over and above that contributed by attitudes and subjective norms. However, it should be noted here that in the structured setting, using this outcome measure (exercise frequency), the reliability of the PBC construct was quite low (see Table 3.1). Even after an item was removed from the analysis and the reliability coefficient improved, it was still only adequate at best. Given the importance of this construct, having an internal consistency that is only adequate may affect its relationships with the other variables. Specifically, if individuals are not able to reliably relay their own perception of control as it relates to intention to exercise, it may not be too surprising that the overall prediction of intention differs from the three other analyses, which included more reliable measures of PBC.

It is interesting to note that the TPB constructs accounted for a similar amount of variance in intention to participate in the unstructured setting when using either energy expenditure or exercise frequency (41% and 38%, respectively). However, when examining the structured setting the TPB constructs were able to account for more than double the amount of variance in intention when predicting with the energy expenditure outcome than with the exercise frequency outcome (43% and 19%, respectively). While this result is interesting, caution must be exercised considering the concern of lower reliability of the measure within the exercise frequency outcome in the structured setting.

As the results across both outcome measures of intention revealed, there was no support for the hypothesis that PBC would be more predictive in the structured setting. In fact, it could be argued that the findings in this study revealed that PBC was a more

important predictor of intention in the unstructured setting. As reported above, in the case of the energy expenditure outcomes, PBC was able to account for more than double the amount of variance in predicting intention in the unstructured setting. While these findings were not predicted, a number of possible explanations may be offered to explain these divergent results. First, the present finding may reflect the fact that the characteristics determining level of control in an unstructured setting may be different than what was assumed. For example, consider an individual who works out at a local fitness facility. In this study, the actual exercise activity was used to differentiate structured versus unstructured: an exercise class was considered to be structured because an instructor is determining what exercises to do versus an individual working out on their own accord and freely choosing what exercises to do (i.e., an unstructured setting). While this is how control was defined in this study, there are other ways in which control can be viewed. It is possible, for instance, that an individual may perceive control as relating to the decision as to which activity to choose rather than how the activity itself is structured. In other words, if an individual has the choice of exercising in one of several available fitness classes at a gym (e.g., spin, step, strength, yoga, etc) the person may perceive more volitional control in this structured setting. Consequently, this level of volitional control in the structured setting may result in PBC becoming a less salient predictor than was assumed in this study.

Another possible explanation for the disparate findings of this study may emanate from my interpretations of the findings of Bryan and Rocheleau (2002), on which the hypotheses for the present study were based. As mentioned previously, in their study they reported that PBC was more predictive in resistance training than in

aerobic training (Bryan and Rocheleau, 2002). The authors reasoned that the aerobic training setting may have had more volitional control because much less equipment was needed and it could be performed anywhere as compared to resistance training, which required expensive equipment and available facilities. As a result, they speculated that less volitional control was available in resistance training, thus making PBC more predictive. However, resistance training in this study would have been placed within the unstructured setting because it is a type of exercise behaviour where the time, frequency, duration, and intensity are self-determined. Therefore, the results from this study may be consistent with those of Bryan and Rocheleau (2002). In other words, the control characteristics that Bryan and Rocheleau (2002) attributed to resistance training may have been erroneously associated, in this study, with a type of setting (i.e., structured) rather than a type of activity.

Further, while discussion concerning the operational definition of structured and unstructured as it relates to control has focused mostly on external factors, it is quite possible that important internal factors were involved and possibly overlooked. As noted previously, PBC is based on the individuals' own set of given control beliefs that are comprised of their perception of available resources and opportunities. In essence, PBC is a product of an individual's beliefs about the presence of factors that may facilitate or impede the performance of a given behaviour (Ajzen, 2002c). There may have been several internal factors that impacted upon the perception of control that were not accounted for in the operationalizing of a structured and unstructured setting as done in this study. For example, an individual's perception of health issues, available time, and available energy are internal factors that may be an important consideration in this

sample. This reasoning is consistent with a recent study that examined barriers to physical activity in university freshmen. In that study, it was found that health issues, lack of sleep, and a need to relax were significantly reported as barriers to being active (Gyurcsik, Spink, Bray, Chad, & Kwan, under review). Perhaps students perceive more control in being able to attend a 45-minute fitness class (i.e., structured setting) over lunch than they do in trying to find time and energy to schedule a meaningful workout (i.e., unstructured setting). Using this reasoning, it could be speculated that there might be more volitional control in the structured setting, which would then be consistent with the results of the current study.

In terms of the other constructs in the theory, it is worth noting that attitudes and subjective norms differentially predicted intention in the different settings regardless of the outcome measure used. Specifically, the subjective norm construct was found to be a significant predictor using both outcomes in the structured setting, but not significant with either outcome measure in the unstructured setting. Attitude, on the other hand, emerged as a significant predictor with both outcomes in the unstructured setting, but was only significant with the exercise frequency outcome in the structured setting. In terms of the unique contribution of subjective norms to intention in the structured setting, semi partial correlations revealed that subjective norms accounted for 15% of the unique variance when using energy expenditure as an outcome and 9% of the unique variance when using exercise frequency. In the unstructured setting, subjective norms were not significantly associated with intention using either outcome measure.

Concerning the unique contribution of attitudes to intention in the structured setting, semi partial correlations illustrated that, while no variance was accounted for

using the energy expenditure outcome, attitudes accounted for 9% of the unique variance in intention when using exercise frequency as an outcome. In the unstructured setting, attitudes accounted for 5% of the unique variance using an energy expenditure outcome measure and 8% of the unique variance using an exercise frequency measure.

The finding that subjective norms were more prevalent in a structured setting than in an unstructured setting was not a predicted relationship. Perhaps in a structured setting, in which other individuals would be involved, there is a moderating variable not being account for. In a study looking at the functional significance of the TPB variables, Chatzisarantis and Biddle (1998) noted that subjective norms predicted intention to exercise only under conditions where behavioural regulation was controlling, rather than autonomous. In other words, the predictive ability of subjective norms on intention increased in individuals who were extrinsically motivated to exercise, while it decreased among individuals who were intrinsically motivated. It is possible that the increased possibility of being extrinsically rewarded by exercising with others may account for the increased salience of subjective norms in the structured setting. On the other hand, the unstructured setting offers the option of exercising alone, which may be more appealing to intrinsically-motivated individuals and, in turn, diminish the importance of subjective norms. Possibly supporting this supposition is the fact that 39% of individual's chose to exercise alone in an unstructured setting in rounds one and two of data collection.

Generally, the overall findings for intention are consistent with what has been found in the literature. For 3 of the 4 regression equations, the amount of variance explained was approximately 40%, which is consistent with a recent meta-analysis

looking at the TPB and exercise (Hagger et al., 2002). In this meta-analysis, it was reported that TPB constructs accounted for 44.5% of the variance in intention to exercise across the studies included. The other regression equation in this study produced a substantially lower amount of explained variance but, as pointed out previously, this may have been a result of a methodological issue associated with a lower internal consistency reliability for PBC. While the reported internal consistency value of $\alpha = .61$ fell within the adequate range of $\alpha = .50 - .70$ suggested by Nunnally and Bernstein (1994), it falls mid-range, and as a result may be one reason why one of the results for total variance accounted for may have differed from the other three results.

An interesting finding in this study was that the salience of the TPB constructs changed not only with a change in setting but also with a change in the measure of the exercise outcome. Take the unstructured setting as an example. When using the energy expenditure outcome, the associated semi partial correlations revealed that attitudes accounted for 5% of the variance in intention to exercise in the forthcoming week while PBC accounted for 30%. Both attitudes and PBC were significant predictors, but PBC was the major contributor. However, when the outcome was changed to exercise frequency, attitudes and PBC contributed the same amount of unique variance in intention to exercise (8%). While the same relationships were not found for the two exercise outcomes in the structured setting, some caution must be put fourth as one of the regression analyses was performed using a variable with only an adequate level of internal reliability. Nevertheless, this result points to a suggestion made by Baranowski, Anderson, and Carmack (1998) that researchers should “not assume the

intersubstitutability of different physical activities" (p. 294) while bearing in mind that different situations (i.e., settings) may require different modes of assessment. Ajzen (1991), himself, also makes reference to this suggestion when he notes that the weighting of any given TPB construct will potentially vary with the setting in question.

One of the most surprising findings of this study was the failure to find a relationship between the TPB constructs and self-reported exercise behaviour. While Hagger et al. (2002) in their meta-analysis reported that TPB constructs accounted for 27% of the variance in exercise behaviour across the studies they included, the highest amount of variance accounted for in the present study was 8%. Further, a significant relationship was only found in the unstructured setting using exercise frequency as an outcome. In all other settings and behaviour outcomes (e.g., structured – energy expenditure, structured – exercise frequency, and unstructured – energy expenditure) no relationships emerged between the predictors and exercise behaviour. Further, PBC was the only significant predictor in the one regression equation that was significant.

The fact that the present findings for predicting exercise behaviour are not consistent with the majority of the extant literature is perplexing. One possibility involves the extenuating circumstances associated with the data collection period. As previously noted, there was a problem associated with the time period between rounds of data collection. The second round of data collection (during which the behaviour data were obtained) occurred nine days after the first round, instead of seven days, because of extenuating circumstances surrounding a national holiday. It is quite possible that the potential factors associated with a holiday or long weekend such as attending family functions (in or out of town), the closure of fitness facilities, and the

general societal norm promoting holidays as a time of relaxation, not exercise, may have lead to a decrease in exercise and subsequently an atypical reported week of exercise. This speculation receives some support in that the results revealed that 54% and 59% of the participants decreased their exercise frequency and energy expenditure, respectively, from round one of data collection to round two. This might suggest that a significant number of participants may have had an atypical week of exercise. Further, although an attempt was made in the questionnaire (for both rounds of data collection) to assess whether the previous week was typical (e.g., more than, less than, or the same), 28% (range of 22 – 34%) of the respondents did not answer the "typical week" question, making it difficult to ascertain if it was a typical week being assessed. As can be seen in Appendices A and B, the "typical week" question was located at the bottom of the table in which exercise participation was recorded and it is possible that participants simply did not see the question. This information would have proved important. For instance, it is quite possible that many of the participants were not aware that the week they were indicating their intentions to exercise would be an atypical week because of the impending holiday. Given the very real possibility that intention might not match the actual behaviour, it may not be surprising that intention was a poor predictor of actual behaviour. In fact, it would violate one of Ajzen's (1991) conditions for accurate prediction of behaviour, which states that "intentions and perceived behavioural control must remain stable in the interval between their assessments and observation of the behaviour" (p. 185). Ajzen goes on to note that "intervening events may produce changes in intentions or in perceptions of behavioural control, with the effect that the

original measures of these variables no longer permit accurate prediction of behaviour" (p. 185).

4.1 Limitations

There are several limitations that may have impacted the results in this study. One limitation relates to sample size. Considering that there were three independent variables in the intention analyses and sample sizes of 50, 65, 79, and 111, and Vincent's (1999) suggested ratio of at least 20 participants for each independent variable, one of the analyses falls short of this prerequisite. Using the same ratio criteria for the behaviour analyses, which had two independent variables and sample sizes of 32, 54, 54, and 86, similar concerns are evident for one of the analyses. A low sample size impacts statistical power, or the ability to reject a null hypothesis (Vincent, 1999), and therefore may limit the reliability of the results and, subsequently, the ability to generalize those results.

As was discussed earlier, a significant limitation of the study was that data collection was scheduled around a national holiday. Not only did the holiday have an apparent impact on participant exercise participation levels, it forced the time between data collection to nine days as opposed to seven. While participants were still instructed to only recall exercise from the seven days following the first round of data collection (i.e., the original seven-day period planned for the study) it may have decreased the accuracy of the participants recall, and therefore decreased the specificity. One of the innovations of this study was the use of a questionnaire that allowed participants to self-identify an individualized and highly specific level of exercise with which to answer

questions pertaining to the TPB. It is quite possible that this attempt to increase specificity may have been severely compromised by the holiday that occurred during the testing period.

Another limitation having to do with self-reporting of behaviour was that participants may have erroneously included sport as part of their exercise behaviour. Participants were told that sport participation could only be included if the main reason for participating was to achieve or gain health benefits. However, it is possible that some participants may have included sport participation if that was their main mode of exercise behaviour, in the interest of not appearing inactive. Given that several students in the class sampled were university athletes, this possibility was magnified.

The demographic characteristics of this sample may also limit the generalization of the findings to a young adult population who have already selected an active lifestyle. Given that the participants were selected from a Kinesiology class, it is possible that these young adults already have a vested interest in exercise participation and it is conceivable that a population such as this may differ from their peers who do not have such a vested interest in being active. As a result, the salience of the TPB variables may change, such that an individual with less of a vested interest in exercise may hold a less favourable attitude toward exercising, for example. Another limitation of having a sample with an active background might be a reduction in outcome variability, which, in turn, might limit the emergence of expected relationships.

Another limitation relating to the demographics of the sample is the ability of the questionnaire to generalize to other populations. The wording of the questionnaire was such that a population not familiar with some of the terms and concepts used in the

questionnaire (i.e., those without a background in exercise) might not fully understand the items being asked. In fact, there may have been some participants in the current study who had trouble understanding the questionnaire items, although this concern was never brought up during data collection. If this study were to be replicated with a different population, the wording may need to be revised to improve its understandability.

Further, while the questionnaire developed for this study was specifically based on recommendations suggested by Ajzen (2002a), different approaches to the questionnaire could have been developed. For example, it might prove worthwhile to conduct a similar study using belief-based, as opposed to direct, measures of the TPB. Beliefs, as discussed in the introduction, are the underlying foundations to the constructs of the TPB. The benefit of applying a belief-based approach is that by determining the important beliefs an individual holds perhaps we can better understand why an individual has a certain attitude toward a given behaviour, perceives subjective norms in a given way, or perceives a certain level of personal control (Ajzen, 2002a). Further, a belief-based approach would provide an opportunity to ascertain what internal factors are salient and associated with perceived control, which might correct a possible oversight in this study discussed earlier in this section. Subsequently, this information may aid in developing a stronger operational definition of structured and unstructured for that population.

A similar limitation relating to the questionnaire concerns the self-reported exercise measure used and the associated criticism of the reliability of self-reported measures of exercise participation (cf. Ainsworth, Montoye, & Leon, 1994). Given that

the exercise recall questionnaire used in this study was a modified version of a different questionnaire, this criticism is highlighted further. This study used recall of one week of exercise whereas the original questionnaire (Kriska, Knowler, LaPorte, et al., 1990) was designed for past-year physical activity recall, though past-week recall also was used in the questionnaire's development. Perhaps other measures of exercise behaviour could have been used in conjunction with, or in place of, the measure chosen for this study. However, correlating the participant responses with "objective" measures of exercise participation (such as pedometers, for example) was not deemed financially viable for this study. The alternative, then, would be to correlate the questionnaire responses in a pilot study with a different questionnaire. However, using a questionnaire that is, perhaps, equally fallible would not necessarily provide any convincing evidence of reliability, regardless of whether the correlations were high or low, positive or negative.

Finally, the conceptualization of the moderator variable may have proved to be a limitation of the current study. Baron and Kenny (1986) suggest that an ideal moderator variable should be uncorrelated with both the predictor and criterion, or dependant, variable. Given that PBC construct and the presumed differences in actual control between structured and unstructured settings might be expected to be correlated, the conceptualization of control being the distinguishing factor between settings may have been problematic. Perhaps, proposing the difference between settings being a function of other factors may have been more appropriate. Given the operational definitions of structured (e.g., exercise parameters determined by others) and unstructured settings (e.g., exercise parameters self –determined) used in this study, one example might be self-determination.

4.2 Future directions

The assumption made in this study was that a structured setting contains less volitional control than an unstructured one. Future research may want to explore these two settings in an attempt to determine, not only what level of control is perceived in each setting, but also what factors or characteristics contribute to that perception of control for each setting. For example, is choice of activity a more salient indicator of control than the structure of a given activity? What types of internal factors are important in the perception of control? This would not be an easy task, given the complexity of the concept of control as can be seen in Skinner's (1996) guide to constructs of control, where she identified and reviewed over 100 control-related constructs. This, perhaps, underlines the importance of determining what aspects of control individuals base their perceptions on. Future research investigating this structured-unstructured dichotomy and its relation to perceived control would benefit the existing literature.

Similarly, the two different settings in this study appeared to alter the salience of the TPB constructs as they related to the prediction of intention. Future research may want to further explore the change in relationships among the theory's constructs as the setting changes. In particular, subjective norms were found to be more prevalent in the structured setting than in the unstructured setting in this study. Perhaps further investigation into the subjective norm construct, specifically, as it relates to exercise setting would provide important insight into the importance of this construct as settings change.

The study also examined two different forms of exercise behaviour, using both an energy expenditure outcome as well as an exercise frequency outcome. Future research may want to further explore how using different types of exercise outcomes changes relationships among predictor variables. Similarly, it would be worthwhile to assess the relative accuracy of different modes of self-reporting with a more objective measure of exercise.

Future researchers also may want to manipulate the time period between data collections. It may be interesting to see how the relationship among the theory's constructs change over the course of a month or 3 months as compared to 7 days as was studied presently. It is possible that a more consistent frequency of exercise recall would emerge, which would address one of the major limitations of this study.

In assessing the theory's constructs, the current study used direct, versus belief-based, measures in the questionnaire. Given that intentions are assessed directly, this is the predominant method of assessing the other constructs as well. However, there is an option of employing a belief-based approach where salient attitudinal, normative, and control beliefs are used to predict intention and behaviour. Future research may want to employ such an inductive approach as it may provide important insight into the theory's constructs, particularly control, and shed some light on the relationship with type of setting.

To determine the impact of different demographic variables, future research also could investigate the role of setting as a moderator in the TPB in different populations and age groups. An older adult population holds several important distinguishing characteristics, which may influence the salience of the TPB constructs as the exercise

setting changes. For example, current or potential health risks may influence what setting an older adult exercises in and, in turn, shape their perception of control. Similarly, studying a target population with a significantly different level of socioeconomic status than what was presumably held by the participants in this study may change the relationships among the TPB constructs. The participants in this study had access to a state of the art fitness facility and a comprehensive recreation program as part of their tuition, whereas the level of access to facilities and programs may be a major contributor to perceived control in a low-SES population. Finally, given the extenuating circumstances surrounding data collection (the intervening holiday), and the subsequent widespread decrease of exercise participation among participants, it would be worthwhile to repeat this study, keeping in mind its limitations, on the same population to see if behaviour could be better predicted.

4.3 Summary

The results from this study showed that the TPB was a good predictor of intention in university-aged males and females. However, intention did not translate into a significant prediction of behaviour, although extenuating circumstances may have mitigated this relationship. Contrary to the hypothesis of the study's main purpose, PBC was not a stronger predictor in the structured exercise setting. While some of the findings from the current study are not consistent with existing literature they do offer some important insights. For example, this study addressed the recommendation that the TPB be applied to different types of exercise (i.e., different settings) as suggested by others (e.g., Baranowski et al., 1998; Poag-DuCharme & Brawley, 1993; and Spink,

2003). It was found that while the model as a whole is similar in its prediction of intention in both settings, the salience of the individual TPB constructs appear to differ. For instance, results showed subjective norms to be much more salient in the structured setting than in the unstructured setting. PBC was significant in both settings, but was a stronger predictor in the unstructured setting. Although this was counter to what was hypothesized, it highlights the importance of considering the setting when examining TPB constructs in the exercise domain.

This study also provided a novel approach to assessing the TPB constructs. The TPB questionnaire items used in this study were based on individualized, self-reported levels of exercise participation. This approach attempted to increase the specificity of the questionnaire items and adhere to Ajzen's (2002a) principle of compatibility. In continuing with this unique approach, this study also took advantage of two modes of exercise outcomes – energy expenditure and exercise frequency. The results from this study highlight the utility of using and distinguishing between different types of exercise outcomes. As an illustration, the results indicated that PBC is more predictive of intention in the unstructured setting using an energy expenditure outcome than it is using an exercise frequency outcome (30% versus 8%, respectively). Finally, while the results from this study point to a possible moderating relationship of exercising setting on the relationships between the TPB constructs, future research should also further explore the methodology used in this study. If research can confirm that self-reporting of energy expenditure is as accurate as self-reporting of exercise frequency, its utilization could be very beneficial in understanding and predicting exercise behaviour.

References

Ainsowrth, B. E., Montoye, H .J., & Leon, A .S. (1994). Methods of assessing physical activity during leisure and work. In C. Bouchard & R. Shephard (Eds.), *Physical activity, fitness, and health: International proceedings and consensus statement* (pp. 146-159). Champaign, IL: Human Kinetics Publishers.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J, Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Heidelberg, Germany: Springer.

Ajzen, I. (1988). *Attitudes, personality, and behavior.* Chicago, IL: Dorsey.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179-211.

Ajzen, I. (2002a). Constructing a TPB Questionnaire: Conceptual and Methodological Considerations. Retrieved May 7, 2003, from http://www-unix.oit.umass.edu/~aizen/tpb.html

Ajzen, I. (2002b). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology, 32*(4), 665-683.

Ajzen, I. (2002c). The Theory of Planned Behavior (TpB) – TpB Model. Retrieved May 7, 2003, from http://www-unix.oit.umass.edu/~aizen/tpb.html (use TpB Model link).

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice Hall.

Andersen, R. E., Wadden, T. A., Bartlett, S. J., Zemel, B., Verde, T. J., & Franokowiak, S. C. (1999). Effects of lifestyle, activity vs. structured aerobic exercise in obese women: A randomized trial. *The Journal of the American Medical Association*, *281*(4), 335-341.

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology, 40*(4), 471-499.

Babrow, A. S., Black, D. R., & Tiffany, S. T. (1990). Beliefs, attitudes, intentions, and a smoking cessation program: A planned behaviour analysis of communication campaign development. *Health Communication, 2*, 145-163.

Bamberg, S., & Schmidt, P. (1993). Choosing between means of transportation – an application of the theory of planned behaviour. *Zeitschrift fur Sozialpsychologie,24*, 25-37.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Upper Saddle River, NJ: Prentice-Hall, Inc

Baranowski, T., Anderson, C., & Carmack, C. (1998). Mediating variable framework in physical activity interventions. How are we doing? How might we do better? *American Journal of Preventive Medicine, 15*(4), 266-297.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Bartko, W. T., & Eccles, J. S. (2003). Adolescent participation in structured and unstructured activities: A person-oriented analysis. *Journal of Youth and Adolescence, 32*(4), 233-241.

Bauman, A. E., Sallis, J. F., Dzewaltowski, D. A., & Owen, N. (2002). Toward a better understanding of the influences on physical activity: The role of determinants, correlates, causal variables, mediators, moderators, and confounders. *American Journal of Preventive Medicine, 23*, 5-14.

Blanchard, C. M., Courneya, K. S., Rodgers, W. M., & Murnaghan, D. M. (2002). Determinants of exercise intention and behavior in survivors of breast and prostate cancer: An application of the theory of planned behavior. *Cancer Nursing, 25*(2), 88-95.

Blue, C. L. (1995). The predictive capacity of the theory of reasoned action and the theory of planned behavior in exercise research: An integrated literature review. *Research in Nursing and Health, 16*, 105-121.

Boule, N. G., Haddad, E., Kenny, G. P., Wells, G. A., & Sigal, R. J. (2001). Effects of exercise on glycemic control and body mass in type 2 diabetes mellitus: A meta-analysis of controlled clinical trials. *Journal of the American Medical Association, 10*, 1218-1227.

Bozionelos, G., & Bennett, P. (1999). The theory of planned behaviour as predictor of exercise. *Journal of Health Psychology, 4*(4), 517-529.

Brawley, L. R. (1993). The practicality of using social psychological theories for exercise and health research intervention. *Journal of Applied Sport Psychology, 5*, 99-115.

Bryan, A. D., & Rocheleau, C. A. (2002). Predicting aerobic versus resistance exercise using the theory of planned behavior. *American Journal of Health Behavior*, *26*(2), 83-94.

Chatzisarantis, N. L. D., & Biddle, S. J. H. (1998). Functional significance of psychological variables that are included in the theory of planned behaviour: A self-determination theory approach to the study of attitudes, subjective norms, perceptions of control and intentions. *European Journal of Social Psychology, 28,* 303-322.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 115-119.

Courneya, K. S., & Friedenreich, C. M. (1997). Determinants of exercise during colorectal cancer treatment: An application of the theory of planned behavior. *Oncology Nursing Forum, 24*(10), 1715-1723.

Courneya, K. S., & Friedenreich, C. M. (1999). Utility of the theory of planned behavior for understanding exercise during breast cancer treatment. *Psycho-oncology, 8,* 112-122.

Craig, C. L., & Cameron, C. (2004). *Increasing physical activity: Assessing trends from 1998-2003*. Ottawa, ON: Canadian Fitness and Lifestyle Research Institute.

Craig, C. L., & Russell, S. J. (2002, May). *Monitoring sport and physical activity participation internationally.* Paper presented at the 3rd COMPASS (Co-ordinated Monitoring of Participation in Sports) Workshop, Rome, Italy. Powerpoint presentation retrieved June 1, 2004 from http://w3.uniroma1.it/compass/report/Canada.ppt

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*, 297-334.

Deforche, B., & Bourdeaudhuij, I. (2000). Differences in psychosocial determinants of physical activity in older adults participating in organised versus non-organised activities. *The Journal of Sports Medicine and Physical Fitness, 40*, 362-372.

Dunn, A. L., Bess, M. H., Kampert, J. B., Garcia, M. E., Kohl, H. W., & Blair, S. N. (1999). Comparison of lifestyle and structured interventions to increase physical activity and cardiorespiratory fitness: A randomized trial. *The Journal of the American Medical Association, 28*(4), 327-333.

Dzewaltowski, D. A., Noble, J. M., & Shaw, J. M. (1990). Physical activity participation: Social cognitive theory versus the theories of reasoned action and planned behavior. *Journal of Sport and Exercise Psychology, 12*, 388-405.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

Fletcher, G. F., Balady, G., Blair, S. N., Blumenthal, J., Casperson, C., Chaitman, B., et al. (1996). Statement on exercise: Benefits and recommendations for physical activity programs for all Americans. A statement for health professionals by the Committee on Exercise and Cardiac Rehabilitation of the Council on Clinical Cardiology, American Heart Association. *Circulation, 94*(4), 857-862.

Godin, G. (1993). The theories of reasoned action and planned behavior: Overview of findings, emerging research problems and usefulness for exercise promotion. *Journal of Applied Sport Psychology,* 5(2), 141-157.

Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its application to health-related behaviors. *American Journal of Health Promotion, 11*(2), 87-98.

Godin, G., Valois, P., & LePage, L. (1993). The pattern of influence of perceived behavioral control upon exercising behavior: an application of Ajzen's theory of planned behavior. *Journal of Behavioral Medicine, 16*(1), 81-102.

Godin, G., Valois, P., Jobin, J., & Ross, A., (1991). Prediction of intention to exercise of individuals who have suffered from coronary heart disease. *Journal of Clinical Psychology, 47*(6), 762-772.

Gyurcsik, N. C., Spink, K. S., Bray, S. R., Chad, K., & Kwan, M. (2004). *Oh no! What will it be next? Barriers to physical activity from grade seven through first-year university.* Manuscript submitted for publication.

Hagger, M. S., Chatzisarantis, N. L. D., & Biddle, S. J. H. (2002). A meta-analytic review of the theories of reasoned action and planned behavior in physical activity: Predictive validity and the contribution of additional variables. *Journal of Sport and Exercise Psychology, 24*, 3-32.

Hasuenblas, H. A., Carron, A. V., & Mack, D. E. (1997). Application of the theories of reasoned action and planned behavior to exercise behavior: A meta-analysis. *Journal of Sport and Exercise Psychology, 19*, 36-51.

Health Canada (2000). *Canada's Physical Activity Guide*. Retrieved July 15, 200, from http://www.hc-sc.gc.ca/hppb/paguide/main.html

Kerner, M. S., Grossman, A. H., & Kurrant, A. B. (2001). The theory of planned behavior as related to intention to exercise and exercise behavior. *Perceptual and Motor Skills, 92*, 721-731.

Kleiber, D. A., Larson, R., & Csikszentmihalyi, M. (1986). The experience of leisure in adolescence. *The Journal of Leisure Research, 18*, 165-176.

Kriska, A. M., & Bennett, P. H. (1992). An epidemiological perspective of the relationship between physical activity and NIDDM: From activity assessment to intervention. *Diabetes Metabolic Review, 8*, 355-372.

Kriska, A. M., Knowler, W. C., LaPorte, R. E., Drash, A. L., Wing, R. R., Blair, S. N., et al. (1990). Development of questionnaire to examine relationship of physical activity and diabetes in Pima Indians. *Diabetes Care, 13*(4), 401-411.

Licht, M. H. (1995). Multiple regression and correlation. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (pp. 19-64). Washington, DC: American Psychological Association.

Miller, T. D., Balady, G. J., & Fletcher, G. F. (1997). Exercise and its role in the prevention and rehabilitation of cardiovascular disease. *Annals of Behavioral Medicine, 19*(3), 220-229.

Mota, J., & Esculcas, C. (2002). Leisure-time physical activity behavior: Structured and unstructured choices according to sex, age, and level of physical activity. *International Journal of Behavioral Medicine, 9*(2), 111-121.

Motl, R. W., Dishman, R. K., Saunders, R. P., Dowda, M., Felton, G., Ward, D. S., et al. (2002). Examining social-cognitive determinants of intention and physical activity among black and white adolescent girls using structural equation modeling. *Health Psychology, 21*(5), 459-467.

Mummery, W. K., & Wankel, L. M. (1999). Training adherence in adolescent competitive swimmers: An application of the theory of planned behavior. *Journal of Sport and Exercise Psychology, 21*, 313-328.

Nucifora, J., Gallois, C., & Kashima, Y. (1993). Influences on condom use among undergraduates: Testing the theories of reasoned action and planned behaviour. In D. J. Terry C. Gallois, & M. Macamish (Eds.), *The theory of reasoned action: Its application to AIDS-preventive behaviour* (pp. 47-64). Oxford: Permagon.

Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd Ed). New York: McGraw-Hill, Inc.

Okun, M. A., Karoly, P., & Lutz, R. (2002). Clarifying the contribution of subjective norm to predicting leisure-time exercise. *American Journal of Health Behavior, 26*(4), 296-305.

Pedhazur, E. J. (1997). *Multiple regression in behavioral research* (3rd Ed.). Orlando, FL: Harcourt Brace College Publishers.

The new Penguin English dictionary (2000). Toronto, ON: Penguin Group.

Piepkorn, M. B. (1990). *An examination of the motivational differences between adults in structured and unstructured exercise programs.* Unpublished master's thesis, Purdue University, West Lafeyette, IN, USA.

Poag-DuCharme, K. A., & Brawley, L. R. (1993). Self-efficacy theory: Use in the prediction of exercise behavior in the community setting. *Journal of Applied Sport Psychology, 5*, 178-194.

Salmon, P. (2001). Effects of physical exercise on anxiety, depression, and sensitivity to stress: a unifying theory. *Clinical Psychology Review, 21*(1), 33-61.

Shephard, R. J. (1991). Medicine and physical activity. In C. Bouchard (Ed.), *Physical activity sciences* (pp. 57-64). Champaign, IL: Human Kinetics Publishers.

Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71,* 549-570.

Spink, K.S. (2003). *Social Influence of Physical Activity Across the Lifespan – Youth and Adolescents.* Invited presentation at the 2003 NASPSPA Conference, Savannah, GA.

Thomas, J. R., & Nelson, J. K. (2001). *Research methods in physical activity* (4th ed.). Champaign, IL: Human Kinetics Publishers.

Vincent, W. J. (1999). *Statistics in Kinesiology* (2nd ed.). Champaign, IL: Human Kinetics Publishers.

Vuillemin, A., Oppert, J. M., Guillemin, F., Essermeant, L., Fontveille, A. M., Galan, P. et al. (2000). Self-administered questionnaire compared with interview to assess past-year physical activity. *Medicine and Science in Sports and Exercise, 32*(6), 1119-1124.

Yordy, G. A., & Lent, R. W. (1993). Predicting aerobic exercise participation: Social cognitive, reasoned action, and planned behavior models. *Journal of Sport and Exercise Psychology, 15*, 363-374.

Appendix A

University of Saskatchewan
Research Project Consent Form

You are invited to participate in a study entitled *Exercise Behaviour in Structured and Unstructured Settings: An Application of the Theory of Planned Behaviour.* Please read the following information carefully and feel free to ask any questions you may have.

Dr. Kevin Spink, Professor, College of Kinesiology, (306) 966-1074.
Jason Bostick, MSc. Candidate, College of Kinesiology, (306) 249-5483

Purpose and Procedures:
The purpose of this study is to understand your feelings, perceptions, and involvement in exercising in different settings.

If you volunteer to participate in this study, you will be asked to complete two questionnaires (one today and a shorter one a week from now) that ask questions about your exercise behaviour. Any questions that you do not feel comfortable answering can be left blank. The questionnaire today will take 10-15 minutes to complete and the one next week about five minutes.

Potential Risks:
Participation in this study presents no anticipated risks.

Potential Benefits:
As a participant, you may be making important contributions to the research literature. We cannot guarantee that you will receive any direct benefits from this study. When this study is complete, you may obtain a summary of the major research findings by contacting Dr. Spink.

Confidentiality:
All data will be stored in a locked filing cabinet at the University of Saskatchewan by Dr. Spink for the next five years. Because there will be two separate data collections, it is necessary for you to identify yourself in order for us to match information from the two questionnaires. However, in order to ensure confidentiality, individual names will be replaced with an identification number before information is entered into the database. A master list of participant names and their identification numbers will be stored separately from the questionnaires. Results will not be presented individually, but as a group. All data will be stored for at least five years in a locked filing cabinet in K. Spink's office.
While the information collected will be used towards a master's thesis and publication in a scientific journal, only overall group responses will be reported so it will not be possible to identify individuals. Moreover, the consent forms will

be stored separately from the questionnaire so, once your name has been replaced by an ID number, it will not be possible to associate a name with any given information on the questionnaire.

Participation and Withdrawal:
Participation in this study is voluntary. If you choose to participate, you may withdraw at any time without penalty or consequence. Any individual questions on the questionnaire that you do not feel comfortable with can be left blank. The instructor will not be present while you are completing the questionnaire, nor will he/she have access to the consent forms. Therefore, the instructor will not know who has decided to participate, so your decision to participate or withdraw will not have any impact on your standing in the class or your final grade. If you should withdraw from the study, any information we have collected will be destroyed. You will be advised if, at any time during the week between data collections, any new information arises that may have a bearing on your decision to participate, though this is not anticipated.

Rights of Research Participants:
If you have any questions concerning the study, please feel free to ask at any point. You are free to contact the researcher at the number provided if you have questions at a later date. The University of Saskatchewan Behavioural Sciences Research Ethics Board approved this study on ethical grounds on September 30, 2003. Any questions regarding your rights as a participant may be addressed to that committee through the Office of Research Services (966-2084). At your request, a summary of the results of this study will be provided to you at the completion of this study.

Consent to Participate in Research
I have read and understood the description provided about this study. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I consent to participate in the study described above, understanding that I may withdraw this consent at any time. A copy of this consent form has been given to me for my records.

If you have any questions about this study, please feel free to contact Dr. Kevin Spink at (306) 966-1074.

_____ _____
Signature of Participant Date

_____ _____
Signature of Researcher Date

Exercise Behaviour In Structured and Unstructured Settings

J.M. Bostick & Dr. K.S. Spink (College of Kinesiology)

Please print: NAME: _____ **AGE**: _____ **SEX**: M or F

Thank you for choosing to participate in this study looking at exercising in different settings.

The purpose of this study is to understand your feelings, perceptions, and involvement in exercising in different settings. **IMPORTANT**: In this study, we are **only** interested in exercise. For the purposes of this questionnaire, exercise is **NOT** the same as physical activity. Physical activity includes any bodily movement that results in energy expenditure. Exercise is a form of physical activity in which there is a purpose – to gain health benefits or improve strength and/or cardiovascular endurance. Finally, as we are interested in exercise only, please do not include involvement in sports unless the main purpose for participation is for health benefits. If you are participating in sport for the sole purpose of skill improvement or competition, please do not include this.

Also, we are interested in exercise that occurs in two types of settings – STRUCTURED and UNSTRUCTURED.

- A structured setting is one in which the *time, place, intensity, frequency and nature* of exercise are predetermined by someone else, **NOT** determined by you or your exercise group (For example, the leader of an aerobics class will predetermine what exercises you do, for how long, at what intensity, and where it takes place).

- An unstructured setting, on the other hand, would include settings where the *time, place, intensity, frequency, and nature* of exercise are determined by **you or your exercise partner(s).**

Please read each question carefully and take time to read any instructions provided. Answer all questions as accurately and as honestly as possible. If you have any questions at all, please do not hesitate to ask. Enjoy!

Appendix B

A. Structured Exercise

*The time, place, intensity, frequency and nature of exercise are predetermined by someone else, **NOT** determined by you or your exercise group (e.g., the leader of an aerobics class will predetermine what exercises you do, for how long, at what intensity, and where they take place).* Some examples include aerobics classes, running/training clubs, Campus Recreation programs, city leagues and so on.

Aerobics class	Aquatics	Badminton	Basketball	Boxing	Biking	Bowling
Curling	Dance (specify type)	Figure Skating	Football	Gymnastics	Kickboxing	Ice Hockey
Lacrosse	Pilates	Running club	Racquetball	Ringette	Rugby	Skipping
Skiing–X country	Skiing-Downhill	Soccer	Softball	Speed Skating	Spin class	Swimming-Syncro
Swimming-Laps	Taebo	Tennis	Training club	Volleyball	Wrestling	Other _____

Please complete the following table as it relates to your involvement in STRUCTURED exercise only.

1. Browse through the activities above and circle those that you have exercised in during the ***past week only***. Remember this is exercise, **not** physical activity. Also, only include sports if a main reason for participation was for health benefits. Next, transfer these activities into the first column of Table 1 below. If any activities are not listed above, please add them yourself.

If you did not participate in any structured exercise during the past week, please proceed directly to Section B (p. 4).

2. Record in the second set of columns, the number of times you exercised in that activity during the past week.
3. In the third column, record the average (not total) number of minutes you were *actually exercising* **each** time (do not include time spent changing clothes, stretching, standing around, etc).
4. In the last column, record the average intensity in which you exercised: Light (slight change from normal breathing), Moderate (above normal breathing), or Heavy (heavy breathing).
5. Below Table 1 add up the total frequency of all the activities in the bold box. This number is ***important*** as you will use it for the questions on the following two pages.
6. Finally, indicate whether the frequency, duration and intensity of the activities recorded in Table 1 are more, less or the same as a typical week.

TABLE 1

Activity	**Number of Times Exercising Last Week** (Add the total number of times you exercised in the bold box below)	**Average Number of Minutes You Were Actually Exercising Each Time**	**Intensity** L = Light M = Moderate H = Heavy
	+		
	+		
Please circle whether this is: ***a) more than, b) less than, or c) the same as*** *a typical week.*	=	**← Use this number for Questions 1-13 in Section A-1 (p. 2-3).**	

A-1. – Structured Exercise

Instructions: The following questions deal with your feelings, perceptions, and involvement in *STRUCTURED* exercise. The number you recorded from the "bold" box in Table 1 (see p. 1) will be used for questions 1-13 of this section (A-1).

Place an "X" in one of the spaces along the continuum that best represents your view on exercising in a structured setting.

⇓ ****Put the number you totalled from Table 1 (p. 1) here****

EXAMPLE ONLY: *"I intend to exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"*

Agree _____ : __**X**__ : _____ : _____ : _____ : _____ : _____ Disagree

⇓ ****Put the number you totalled from Table 1 (p. 1) here****

1) *"For me to exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1) is…"*

Harmful	_____ : _____ : _____ : _____ : _____ : _____ : _____	Beneficial
Pleasant	_____ : _____ : _____ : _____ : _____ : _____ : _____	Unpleasant
Good	_____ : _____ : _____ : _____ : _____ : _____ : _____	Bad
Enjoyable	_____ : _____ : _____ : _____ : _____ : _____ : _____	Not Enjoyable
Boring	_____ : _____ : _____ : _____ : _____ : _____ : _____	Fun
Useful	_____ : _____ : _____ : _____ : _____ : _____ : _____	Useless

2) *"I intend to exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"*

Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

3) *"People most important to me think I*

Should _____ : _____ : _____ : _____ : _____ : _____ : _____ Should Not

exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"

4) *"I will try to exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"*

Definitely True _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely False

5) *"For me to exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1) would be"*

Easy _____ : _____ : _____ : _____ : _____ : _____ : _____ Difficult

6) *"It is expected of me that I exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"*

Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

7) *"How much control do you believe you have over exercising ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that you reported in TABLE 1 (see p. 1)"*

No Control _____ : _____ : _____ : _____ : _____ : _____ : _____ Complete Control

8) *"Those people in my life whose opinion I value would*

Disapprove _____ : _____ : _____ : _____ : _____ : _____ : _____ Approve

of me exercising ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"

9) *"Those people in my life whose opinion I value are*

Active _____ : _____ : _____ : _____ : _____ : _____ : _____ Not Active

___ times or more in a structured setting at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"

10) *"If I wanted to I could exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"*

Definitely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely True

11) *"People most important to me will exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"*

Completely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Completely True

12) *"I plan to exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"*

Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

13) *"It is mostly up to me whether or not I exercise ___ times or more in a structured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 1 (see p. 1)"*

Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

B. Unstructured Exercise

The time, place, intensity, frequency, and nature of exercise are determined by ***you or your exercise partner(s).*** Some examples include a regular weight-lifting program, going for a run or jog alone or with friends/colleagues, playing pick-up games/sports, and so on.

Aerobics (e.g., Home Video)	Badminton	Basketball	Boxing	Biking/Cycling	Bowling	Cardio (Treadmill, X-Trainer, etc)
Dance (specify type)	Figure Skating	Football	Gymnastics	Ice Hockey	Martial Arts/Kickbox	Racquetball
Ringette	Rugby	Running/Jogging	Skipping	Skiing-X country	Skiing-Downhill	Snowboarding
Soccer	Softball	Speed Skating	Street/Floor hockey	Swimming-syncro	Swimming-Laps	Tennis
Track & Field	Volleyball	Wrestling	Walking	Wall Climbing	Weight lifting	Other _____

Please complete the following table as it relates to your involvement in UNSTRUCTURED exercise only.

1. Browse through the activities above and circle those that you have exercised in during the ***past week only.*** Remember this is exercise, **not** physical activity. Also, only include sports if a main reason for participation was for health benefits. Next, transfer these activities into the first column of Table 2 below. If any activities are not listed above, please add them yourself. **Also,** specify if the activity was done alone or with others by either putting an **'A'** or an **'O'** in the second column.

If you did not participate in any unstructured exercise during the past week, you are finished the questionnaire! Thanks for your participation!

2. Record in the third set of columns, the number of times you exercised in that activity during the past week.
3. In the next column, record the average (not total) number of minutes you were *actually exercising* **each** time (do not include time spent changing clothes, stretching, standing around, etc).
4. In the last column, record the average intensity in which you exercised: Light (slight change from normal breathing), Moderate (above normal breathing), or Heavy (heavy breathing).
5. Below Table 2 add up the total frequency of all the activities in the bold box. This number is ***important*** as you will use it for the questions on the following two pages.
6. Finally, indicate whether the frequency, duration and intensity of the activities recorded in Table 2 are more, less or the same as a typical week.

TABLE 2

Activity	Activity was done: **Alone** = A **With Others** = O	**Number of Times Exercising Last Week** (Add the total number of times you exercised in the bold box below)	**Average Number of Minutes You Were Actually Exercising Each Time**	**Intensity** L = Light M = Moderate H = Heavy
		+		
		+		
Please circle whether this is: ***a) more than, b) less than, or c) the same as*** *a typical week.*		=	**← Use this number for Questions 1-13 in Section B-1 (p. 5-6).**	

B-1. – Unstructured Exercise

The following questions deal with your feelings, perceptions, and involvement in *UNSTRUCTURED* exercise. The number you recorded from the "bold" box in Table 2 (see p. 4) will be used for questions 1-13 of this section (B-1).

Place an "X" in one of the spaces along the continuum that best represents your view on exercising in an unstructured setting.

⇓ ****Put the number you totalled from Table 2 (p. 4) here****

EXAMPLE ONLY: *"I intend to exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Agree _____ : _____ : _____ : _____ : __**X**__ : _____ : _____ Disagree

⇓ ****Put the number you totalled from Table 2 (p. 4) here****

1) *"For me to exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4) is…"*

Harmful	_____ : _____ : _____ : _____ : _____ : _____ : _____	Beneficial
Pleasant	_____ : _____ : _____ : _____ : _____ : _____ : _____	Unpleasant
Good	_____ : _____ : _____ : _____ : _____ : _____ : _____	Bad
Enjoyable	_____ : _____ : _____ : _____ : _____ : _____ : _____	Not Enjoyable
Boring	_____ : _____ : _____ : _____ : _____ : _____ : _____	Fun
Useful	_____ : _____ : _____ : _____ : _____ : _____ : _____	Useless

2) *"I intend to exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

3) *"People most important to me think I should exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Should _____ : _____ : _____ : _____ : _____ : _____ : _____ Should Not

4) *"I will try to exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Definitely True _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely False

5) *"For me to exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4) would be"*

Easy _____ : _____ : _____ : _____ : _____ : _____ : _____ Difficult

6) *"It is expected of me that I exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

7) *"How much control do you believe you have over exercising ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that you reported in TABLE 2 (see p. 4)"*

No Control _____ : _____ : _____ : _____ : _____ : _____ : _____ Complete Control

8) *"Those people in my life whose opinion I value would*

Disapprove _____ : _____ : _____ : _____ : _____ : _____ : _____ Approve

of me exercising ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"

9) *"Those people in my life whose opinion I value are*

Active _____ : _____ : _____ : _____ : _____ : _____ : _____ Not Active

___ times or more in an unstructured setting at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"

10) *"If I wanted to I could exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Definitely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely True

11) *"People most important to me will exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Completely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Completely True

12) *"I plan to exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

13) *"It is mostly up to me whether or not I exercise ___ times or more in an unstructured setting during the NEXT week at a duration and intensity similar to the previous week that I reported in TABLE 2 (see p. 4)"*

Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

YOU ARE FINISHED! THANK YOU FOR YOUR PARTICIPATION

Appendix C

A. Structured Exercise

The time, place, intensity, frequency and nature of activity are predetermined by someone else, ***NOT*** *determined by you or your exercise group (e.g., the leader of an aerobics class will predetermine what exercises you do, for how long, at what intensity, and where they take place).* Some examples include aerobics classes, running/training clubs, Campus Recreation programs, city leagues and so on.

Aerobics class	Aquatics	Badminton	Basketball	Boxing	Biking	Bowling
Curling	Dance (specify type)	Figure Skating	Football	Gymnastics	Kickboxing	Ice Hockey
Lacrosse	Pilates	Running club	Racquetball	Ringette	Rugby	Skipping
Skiing–X country	Skiing-Downhill	Soccer	Softball	Speed Skating	Spin class	Swimming-Syncro
Swimming-Laps	Taebo	Tennis	Training club	Volleyball	Wrestling	Other _____

Please complete the following table as it relates to your involvement in STRUCTURED exercise.

1. Browse through the activities above and circle those that you have exercised in during the ***past week only***. Remember this is exercise, **not** physical activity. Also, only include sports if a main reason for participation was for health benefits. Next, transfer these activities into the first column of Table 1 below. If any activities are not listed above, please add them yourself.

If you did not participate in any structured exercise during the past week, please proceed directly to Section B (p. 4).

2. Record in the second set of columns, the number of times you exercised in that activity during the past week.
3. In the third column, record the average (not total) number of minutes you were *actually exercising* **each** time (do not include time spent changing clothes, stretching, standing around, etc).
4. In the last column, record the average intensity in which you exercised: Light (slight change from normal breathing), Moderate (above normal breathing), or Heavy (heavy breathing).
5. Finally, below Table 1 indicate whether the frequency, duration and intensity of the activities recorded in Table 1 are more, less or the same as a typical week.

TABLE 1

Activity	**Number of Times Exercising Last Week**	**Average Number of Minutes You Were Actually Exercising Each Time**	**Intensity** L = Light M = Moderate H = Heavy

Please circle *whether this is:* ***a) more than, b) less than, or c) the same as* *a typical week.*

A-1. – Structured Exercise

Instructions: The following questions deal with your feelings, perceptions, and involvement in *STRUCTURED* exercise. The questions also refer to the energy you expend (i.e. the calories you burn) from exercise. Think of the level of energy you expended via the activities you listed in Table 1 (see p. 1), and use that as a reference for the following questions. Place an "X" in one of the spaces along the continuum that best represents your view on exercising in a structured setting.

EXAMPLE ONLY: *"I intend to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week"*

Agree _____ : __**X**__ : _____ : _____ : _____ : _____ : _____ Disagree

1) *"For me to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week is…"*

Harmful	_____ : _____ : _____ : _____ : _____ : _____ : _____	Beneficial
Pleasant	_____ : _____ : _____ : _____ : _____ : _____ : _____	Unpleasant
Good	_____ : _____ : _____ : _____ : _____ : _____ : _____	Bad
Enjoyable	_____ : _____ : _____ : _____ : _____ : _____ : _____	Not Enjoyable
Boring	_____ : _____ : _____ : _____ : _____ : _____ : _____	Fun
Useful	_____ : _____ : _____ : _____ : _____ : _____ : _____	Useless

2) *"I intend to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week"*

Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

3) *"People most important to me think I*

Should _____ : _____ : _____ : _____ : _____ : _____ : _____ Should Not

exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week."

4) *"I will try to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week"*

Definitely True _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely False

5) *"For me to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week would be"*

Easy _____ : _____ : _____ : _____ : _____ : _____ : _____ Difficult

6) *"It is expected of me that I exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week."*

Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

7) *"How much control do you believe you have over exercising in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week?"*

No Control _____ : _____ : _____ : _____ : _____ : _____ : _____ Complete Control

8) *"Those people in my life whose opinion I value would*

Disapprove _____ : _____ : _____ : _____ : _____ : _____ : _____ Approve

of me exercising in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week."

9) *"Those people in my life whose opinion I value are*

Active _____ : _____ : _____ : _____ : _____ : _____ : _____ Not Active

in a structured setting at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week."

10) *"If I wanted to I could exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week"*

Definitely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely True

11) *"People most important to me will exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week."*

Completely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Completely True

12) *"I plan to exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week"*

Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

13) *"It is mostly up to me whether or not I exercise in a structured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 1 (see p. 1) for the previous week?"*

Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

B. Unstructured Exercise

The time, place, intensity, frequency, and nature of exercise are determined by ***you or your exercise partner(s).*** Some examples include a regular weight-lifting program, going for a run or jog alone or with friends/colleagues, playing pick-up games/sports, and so on.

Aerobics (e.g., Home Video)	Badminton	Basketball	Boxing	Biking/Cycling	Bowling	Cardio (Treadmill, X-Trainer, etc)
Dance (specify type)	Figure Skating	Football	Gymnastics	Ice Hockey	Martial Arts/Kickbox	Racquetball
Ringette	Rugby	Running/Jogging	Skipping	Skiing-X country	Skiing-Downhill	Snowboarding
Soccer	Softball	Speed Skating	Street/Floor hockey	Swimming-syncro	Swimming-Laps	Tennis
Track & Field	Volleyball	Wrestling	Walking	Wall Climbing	Weight lifting	Other _____

Please complete the following table as it relates to your involvement in UNSTRUCTURED exercise.

1. Browse through the activities above and circle those that you have exercised in during the ***past week only.*** Remember this is exercise, **not** physical activity. Also, only include sports if a main reason for participation was for health benefits. Next, transfer these activities into the first column of Table 2 below. If any activities are not listed above, please add them yourself. **Also,** specify if the activity was done alone or with others by either putting an **'A'** or an **'O'** in the second column.

If you did not participate in any unstructured exercise during the past week, you are finished the questionnaire! Thank you for your participation!

2. Record in the third set of columns, the number of times you exercised in that activity during the past week.
3. In the fourth column, record the average (not total) number of minutes you were *actually exercising* **each** time (do not include time spent changing clothes, stretching, standing around, etc).
4. In the last column, record the average intensity in which you exercised: Light (slight change from normal breathing), Moderate (above normal breathing), or Heavy (heavy breathing).
5. Finally, below Table 2 indicate whether the frequency, duration and intensity of the activities recorded in Table 2 are more, less or the same as a typical week.

TABLE 2

Activity	Activity was done: **Alone** = A **With Others** = O	**Number of Times Exercising Last Week**	**Average Number of Minutes You Were Actually Exercising Each Time**	**Intensity** L = Light M = Moderate H = Heavy
Please circle* *whether this is:* ***a) more than, b) less than, or c) the same as *a typical week.*				

B-1. – Unstructured Exercise

The following questions deal with your feelings, perceptions, and involvement in *UNSTRUCTURED* exercise. The questions also refer to the energy you expend (i.e. the calories you burn) from exercise. Think of the level of energy you expended via the activities you listed in Table 2 (see p. 4), and use that as a reference for the following questions. Place an "X" in one of the spaces along the continuum that best represents your view on exercising in an unstructured setting.

EXAMPLE ONLY: *"I intend to exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week"*

Agree _____ : _____ : _____ : _____ : __**X**__ : _____ : _____ Disagree

1) *"For me to exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week is…"*

Harmful	_____ : _____ : _____ : _____ : _____ : _____ : _____	Beneficial
Pleasant	_____ : _____ : _____ : _____ : _____ : _____ : _____	Unpleasant
Good	_____ : _____ : _____ : _____ : _____ : _____ : _____	Bad
Enjoyable	_____ : _____ : _____ : _____ : _____ : _____ : _____	Not Enjoyable
Boring	_____ : _____ : _____ : _____ : _____ : _____ : _____	Fun
Useful	_____ : _____ : _____ : _____ : _____ : _____ : _____	Useless

2) *"I intend to exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week"*

Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

3) *"People most important to me think I*

Should _____ : _____ : _____ : _____ : _____ : _____ : _____ Should Not

exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week."

4) *"I will try to exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week"*

Definitely True _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely False

5) *"For me to exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week would be"*

Easy _____ : _____ : _____ : _____ : _____ : _____ : _____ Difficult

6) *"It is expected of me that I exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week."*

Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Disagree

7) *"How much control do you believe you have over exercising in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week?"*

No Control _____ : _____ : _____ : _____ : _____ : _____ : _____ Complete Control

8) *"Those people in my life whose opinion I value would*

Disapprove _____ : _____ : _____ : _____ : _____ : _____ : _____ Approve

of me exercising in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week."

9) *"Those people in my life whose opinion I value are*

Active _____ : _____ : _____ : _____ : _____ : _____ : _____ Not Active

in an unstructured setting at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week."

10) *"If I wanted to I could exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week"*

Definitely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Definitely True

11) *"People most important to me will exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week."*

Completely False _____ : _____ : _____ : _____ : _____ : _____ : _____ Completely True

12) *"I plan to exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week"*

Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

13) *"It is mostly up to me whether or not I exercise in an unstructured setting during the NEXT week at an energy expenditure level similar to or greater than the one that I reported in TABLE 2 (see p. 4) for the previous week?"*

Strongly Agree _____ : _____ : _____ : _____ : _____ : _____ : _____ Strongly Disagree

YOU ARE FINISHED! THANK YOU FOR YOUR PARTICIPATION

Appendix D

A. Structured Exercise

The time, place, intensity, frequency and nature of activity are predetermined by someone else, ***NOT*** *determined by you or your exercise group (e.g., the leader of an aerobics class will predetermine what exercises you do, for how long, at what intensity, and where they take place).* Some examples include aerobics classes, running/training clubs, Campus Recreation programs, city leagues and so on.

Aerobics class	Aquatics	Badminton	Basketball	Boxing	Biking	Bowling
Curling	Dance (specify type)	Figure Skating	Football	Gymnastics	Kickboxing	Ice Hockey
Lacrosse	Pilates	Running club	Racquetball	Ringette	Rugby	Skipping
Skiing–X country	Skiing-Downhill	Soccer	Softball	Speed Skating	Spin class	Swimming-Syncro
Swimming-Laps	Taebo	Tennis	Training club	Volleyball	Wrestling	Other _____

Please complete the following table as it relates to your involvement in STRUCTURED exercise.

1. Browse through the activities above and circle those that you have exercised in during the ***past week only***. Remember this is exercise, **not** physical activity. Also, only include sports if a main reason for participation was for health benefits. Next, transfer these activities into the first column of Table 1 below. If any activities are not listed above, please add them yourself.

If you did not participate in any structured exercise during the past week, please proceed directly to Section B (p. 4).

2. Record in the second set of columns, the number of times you exercised in that activity during the past week.
3. In the third column, record the average (not total) number of minutes you were *actually exercising* **each** time (do not include time spent changing clothes, stretching, standing around, etc).
4. In the last column, record the average intensity in which you exercised: Light (slight change from normal breathing), Moderate (above normal breathing), or Heavy (heavy breathing).
5. Finally, below Table 1 indicate whether the frequency, duration and intensity of the activities recorded in Table 1 are more, less or the same as a typical week.

TABLE 1

Activity	**Number of Times Exercising Last Week**	**Average Number of Minutes You Were Actually Exercising Each Time**	**Intensity** L = Light M = Moderate H = Heavy

Please circle *whether this is:* ***a) more than, b) less than, or c) the same as* *a typical week.*

B. Unstructured Exercise

The time, place, intensity, frequency, and nature of exercise are determined by ***you or your exercise partner(s).*** Some examples include a regular weight-lifting program, going for a run or jog alone or with friends/colleagues, playing pick-up games/sports, and so on.

Aerobics (e.g., Home Video)	Badminton	Basketball	Boxing	Biking/Cycling	Bowling	Cardio (Treadmill, X-Trainer, etc)
Dance (specify type)	Figure Skating	Football	Gymnastics	Ice Hockey	Martial Arts/Kickbox	Racquetball
Ringette	Rugby	Running/Jogging	Skipping	Skiing-X country	Skiing-Downhill	Snowboarding
Soccer	Softball	Speed Skating	Street/Floor hockey	Swimming-syncro	Swimming-Laps	Tennis
Track & Field	Volleyball	Wrestling	Walking	Wall Climbing	Weight lifting	Other _____

Please complete the following table as it relates to your involvement in UNSTRUCTURED exercise.

1. Browse through the activities above and circle those that you have exercised in during the ***past week only.*** Remember this is exercise, **not** physical activity. Also, only include sports if a main reason for participation was for health benefits. Next, transfer these activities into the first column of Table 2 below. If any activities are not listed above, please add them yourself. **Also,** specify if the activity was done alone or with others by either putting an **'A'** or an **'O'** in the second column.

If you did not participate in any unstructured exercise during the past week, you are finished the questionnaire! Thank you for your participation!

2. Record in the third set of columns, the number of times you exercised in that activity during the past week.
3. In the fourth column, record the average (not total) number of minutes you were *actually exercising* **each** time (do not include time spent changing clothes, stretching, standing around, etc).
4. In the last column, record the average intensity in which you exercised: Light (slight change from normal breathing), Moderate (above normal breathing), or Heavy (heavy breathing).
5. Finally, below Table 2 indicate whether the frequency, duration and intensity of the activities recorded in Table 2 are more, less or the same as a typical week.

TABLE 2

Activity	Activity was done: **Alone** = A **With Others** = O	**Number of Times Exercising Last Week**	**Average Number of Minutes You Were Actually Exercising Each Time**	**Intensity** L = Light M = Moderate H = Heavy
Please circle* *whether this is:* ***a) more than, b) less than, or c) the same as *a typical week.*				

APPENDIX E

UNIVERSITY OF SASKATCHEWAN
BEHAVIOURAL RESEARCH ETHICS BOARD

http://www.usask.ca/research/ethics.shtml

NAME: Kevin Spink (J. Bostick) **BSC#:** 03-1162

College of Kinesiology

DATE: September 30, 2003

The University of Saskatchewan Behavioural Research Ethics Board has reviewed the Application for Ethics Approval for your study "Exercise Behaviour in Structured and Unstructured Settings: An Application of the Theory of Planned Behaviour" (03-1162).

1. Your study has been APPROVED.

2. Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Committee consideration in advance of its implementation.

3. The term of this approval is for 5 years.

4. This approval is valid for five years on the condition that a status report form is submitted annually to the Chair of the Committee. This certificate will automatically be invalidated if a status report form is not received within one month of the anniversary date. Please refer to the website for further instructions: http://www.usask.ca/research/behavrsc.shtml

I wish you a successful and informative study.

__David Hay_____
Dr. David Hay, Acting Chair
University of Saskatchewan
Behavioural Research Ethics Board

DH/ck